Renewable Energy Policy Development in Australia as a Response to Climate Change

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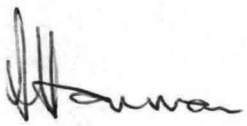
If governments, industry, the financial community and the general public are brought together in a common endeavour, there is every reason to believe in a future where the value of renewables can be measured by their positive impact on sustainability in the world's energy systems. This includes making a real contribution to eradicating poverty and raising living standards in the third world, adding value to the social well-being of poor populations.

Hans Joergen Koch
(2002, 684)

Statement of Authenticity

This thesis contains no material that has been accepted for the award of any other higher degree or graduate diploma in any tertiary institution. To the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except when due reference is made in the text of this thesis.

Signed: 

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Abstract

This thesis examines the development of renewable energy policy in Australia as a response to climate change. Premised on the fact that climate change is a manifestation of humanity currently not living within sustainable limits, and that climate change is a global issue requiring a global response, the development of renewable energy alternatives to electricity supply is envisaged to play an increasing role in a carbon constrained world.

In response to international efforts supporting the United Nations Framework Convention on Climate Change, and to address notoriety gained from being one the highest greenhouse gas emitters in the world, the Commonwealth of Australia, initiated measures to facilitate greenhouse gas abatement. Australia set global precedents by taking the lead through the establishment of the Australian Greenhouse Office and the implementation of the *Renewable Energy (Electricity) Act 2000*. The Act effectively launched an era of renewable energy activity in Australia associated with wind, solar, biomass, geothermal and hydro power developments.

While ostensibly Australia's political climate should have provided extremely favourable conditions for the development of renewable energy solutions this has not proved to be the case. To find out what has positively influenced, or oppositely constrained, developments in Australia this study set out to address two main aims. First, to determine international and Commonwealth of Australia factors influencing renewable energy policy developments in Australia. Second, to assess whether or not the Commonwealth is serious about developing renewable energy resources in Australia.

International and Commonwealth processes that have influenced renewable energy policy developments were investigated through a search and review of available literature and reports. The advancement of climate change policies and associated growth of renewable energy developments were traced from the 1970s until 2003. Key issues and debates in Australia were identified through reports and a detailed examination and assessment of the Commonwealth Government's Parliamentary Debates from February 1997 until

December 2003. Information drawn from 948 Hansards was gathered and thematically analysed to identify the main facets of political discussion.

A number of issues were identified as effecting Australia's renewable energy developments. Australia's position as the world's largest per capita greenhouse gas emitter and the Commonwealth Government's refusal to ratify the Kyoto Protocol are factors of international importance. So too is the alliance between Australia and the United States of America regarding climate change related initiatives. Insecurity surrounding the nature and longevity of the sole mandatory response to global climate change, in the form of the *Renewable Energy (Electricity) Act 2000* and its Mandatory Renewable Energy Target, can be considered to be the most influential factor impacting on renewable energy developments in Australia. The Commonwealth Government's focus on cleaner coal technology and geosequestration at the expense of renewable energy research and development also has significant short and long term implications. Ineffective allocation of budgets, the existence of a strong fossil fuel lobby and the absence of a national energy policy all contribute to a milieu not conducive to successful development and implementation of renewable energy initiatives.

Based on a review of these key issues the study concludes that, despite the imminence of climate change and the knowledge that deep cuts in greenhouse gas emissions of up to 50-60 per cent this century are envisaged, the development of renewable energy alternatives to fossil fuel derived electricity sources has been restricted by the Australian Commonwealth Government. The conclusion is, Australia has not implemented the policies and practices that are required to encourage increased investment and provide the opportunity for renewable energy industries to grow. Australia does not have a renewable energy policy and is not serious about developing its renewable energy resources.

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Specific Conversions

1 Gigagram (Gg) is equivalent to 1000 metric tonnes (t)
1000 Gigagram (Gg) is equivalent to 1 Million metric tonnes (Mt)

Abbreviations and Acronyms

Abbreviations and Acronyms	Text in Full
ABARE	Australia Bureau of Agriculture and Resource Economics
ACRE	Australian Cooperative Research Centre for Renewable Energy
AD	Australian Democrats
AG	Australian Greens
AGO	Australian Greenhouse Office
ALP	Australian Labor Party
ANZMEC	Australian and New Zealand Minerals and Energy Council
AOSIS	Alliance of Small Island States
APEC	Asia - Pacific Economic Cooperation
AusWEA	Australian Wind Energy Association
BCSE	Australian Business Council for Sustainable Energy
CAP	Climate Action Partnership
CDM	Clean Development Mechanism
COAG	Council of Australian Governments
CO_2	Carbon dioxide
CO_2-e	Carbon dioxide equivalent
COP	Conference of Parties
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DFAT	Department of Foreign Affairs and Trade
DITR	Department of Industry, Tourism and Resources
EREILG	Emerging and Renewable Energy Industry Leadership Group
ECITA	Environment, Communications, Information Technology and the Arts Legislation Committee
EFIC	Export Finance and Insurance Corporation
ERDC	Energy Research and Development Corporation
GDP	Gross Domestic Product
Gg	Gigagram
GGAP	Greenhouse Gas Abatement Program
GHC	Greenhouse Challenge
GWh	Gigawatt hours
Hansard	Australian Commonwealth Government Parliamentary Debates
Hon.	Honourable
IEA	International Energy Agency
IGAE	Inter Governmental Agreement on the Environment
IGNC	Inter Governmental Negotiating Committee
IPG	Implementation Planning Group
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
LP	Liberal Party
MCE	Ministerial Council on Energy
MP	Member of Parliament
MRET	Mandatory Renewable Energy Target

Abbreviations and Acronyms	Text in Full
Mt	Million metric tonnes
MW	Megawatt
MWh	Megawatt hours
NP	National Party
NGGI	National Greenhouse Gas Inventory
NGRS	National Greenhouse Resource Strategy
NGS	National Greenhouse Strategy
NSESD	National Strategy for Ecologically Sustainable Development
OECD	Organisation for Economic Development
ORER	Office of Renewable Energy Projects
PJ	Peta Joules
REAA	Renewable Energy Action Agenda
REC	Renewable Energy Certificate
RECP	Renewable Energy Commercialisation Program
REEF	Renewable Energy Equity Fund
REEN	Renewable Energy Export Network
REEEP	Renewable Energy and Energy Efficiency Partnership
REGA	Renewable Energy Generators of Australia
REID	Renewable Energy Industry Development Program
ROUNDTABLE	Renewable and Sustainable Energy ROUNDTABLE
RRPGP	Remote Renewables Power Generation Program
SEDA	Sustainable Energy Development Authority
SEIA	Sustainable Energy Industry Association
TAI	The Australia Institute
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America
WBCSD	World Business Council on Sustainable Development
WCP	World Climate Programme
WCRE	World Council for Renewable Energy
WEHAB	Water, Energy, Health, Agriculture and Biodiversity
WMO	World Meteorological Organisation
WSSD	World Summit on Sustainable Development

1. Background and Aims of the Research

1.1. Introduction and Background

This thesis examines the development of renewable energy policy in Australia as a response to climate change. Scientific research and monitoring, undertaken by organisations such as the Intergovernmental Panel on Climate Change (IPCC) over the last three decades, indicates that the planet is undergoing climate change as a result of global warming (IPCC, 2001; United Nations, 1996; World Commission on Environment and Development, 1987; World Meteorological Organisation, 1979). Anticipated increases in temperature of between 1.4 and 5.8°C are expected to significantly impact on all aspects of life, with far-reaching and cascading effect (Climate Change Secretariat, 2002). Warnings of the potential implications on the hydrological cycle alone, from changing weather patterns, to reduction in rainfall and river flow, to increases in number and nature of storm events, are sufficient to alert policy and decision makers that national and global action is required. Reducing emissions to the atmosphere, developing alternative energy solutions and implementing adaptive mechanisms to minimise the impending consequences are recognised as essential steps in an overall plan of action.

Instigated by the development of the United Nations Framework Convention on Climate Change (UNFCCC), Australia initiated efforts to address climate change. The Australian Greenhouse Office (AGO), the world's first government organisation specifically dealing with climate change, was established. The *Renewable Energy (Electricity) Act 2000* and its cornerstone Mandatory Renewable Energy Target (MRET) were implemented. In addition, national strategies, best practice initiatives, government/industry partnerships and development programs placed Australia at the forefront of greenhouse gas abatement efforts. Viewed within the framework of a fossil fuel dominated economy the establishment of these initiatives was considered a success. However, as will be evident through this study, Australia's political and environmental circumstances have had, and continue to have, a significant impact on renewable energy developments to the extent that the once held leadership role has been forsaken and renewable energy developments that originally held such promise now falter.

The geographical characteristics of Australia make it particularly vulnerable to potential impacts of climate change. The sixth largest nation in the world, Australia occupies an

entire continent of 7.7 million km^2. The country is flat and predominantly hot and dry with "more than one-fifth of its land area [being] desert, [and] more than two-thirds being classified as arid or semi-arid" (Koala Net, 2003, np). Of the approximately 20 million population, 80% live along the coast. Possible decreases in rainfall, increases in temperature, variations in run-off and increases in weather extremes could have a significant impact on human and ecosystem health and survival, agricultural productivity and economic viability. Understanding that climate change is a manifestation of humanity not living within environmental limits and that climate change is a global issue requiring a global response, it becomes clear that Australia has a significant role to play. All the more significant is that role when, on a per capita basis, Australia has the highest level of greenhouse gas emissions in the world (Turton & Hamilton, 2002).

Energy projections to 2030, made by the International Energy Agency (IEA) in their World Energy Outlook (International Energy Agency, 2002) report, highlight some key issues pertaining to energy demand and climate change.

- The earth's energy resources are purportedly sufficient to meet demand until 2030, however, there are serious concerns over "the security of energy supplies, investment in energy infrastructure, the threat of environmental damage caused by energy production and use and the unequal access of the world's population to modern energy" (International Energy Agency, 2002, 25).
- Fossil fuels (oil, coal and gas) are envisaged to continue dominating the world's energy mix with the inequitable distribution of these resources between countries threatening energy security.
- Developing countries, such as India and China, will start becoming large consumers of commercial energy, approaching the levels of OECD (Organisation for Economic Development) countries.
- Energy trade is expected to "expand rapidly" (International Energy Agency, 2002, 25) thereby increasing the interdependence of the world's nations.
- The "expansion of production and supply capacity will call for massive investment at every link in the energy supply chain" (International Energy Agency, 2002, 26).
- Carbon dioxide emissions related to energy consumption will grow despite current initiatives to curb emissions.

- A "projected 1.4 billion people will still be without electricity in 2030" (International Energy Agency, 2002, 26).
- Controlling the growth in demand for energy and moving away from fossil fuels is encouraged.

A key statement, made by the IEA in its assessment of the earth's short-term energy status, is the focus of this thesis:

> Renewable energy will play a growing role in the world's primary energy mix (International Energy Agency, 2002, 28).

Sustainable, renewable energy options bring to the forefront wind, solar, wave, tidal, biomass and geothermal energy. These alternative sources to the generation of electricity are considered sustainable because reserves are unlimited, they are not depleted through use, and because the contribution these sources of energy make to greenhouse gas emissions is minimal. While hydropower has historically been the major source of renewable electricity production, the IEA report envisages that "its share in global primary energy will hold steady, but its share of electricity generation will fall. Non-hydro renewables, taken as a group, are projected to grow faster than any other primary energy source, at an average rate of 3.3% per year. Wind power and biomass will grow most rapidly, especially in OECD countries. However, non-hydro renewables will still make only a small dent in global energy demand in 2030, because they start from a very low base" (International Energy Agency, 2002, 28). The IEA suggests that the "rapid growth of renewables and savings in electricity demand" will result in "the biggest reduction in CO_2 emissions" (International Energy Agency, 2002, 32). This explains the move by most OECD Governments to highlight the development of renewable energy in their long term planning. Diversifying energy supplies by both energy type and source (Koch, 2002, 673) is now a priority for energy planners worldwide. With this understanding, the thesis investigates the policy initiatives that have been undertaken in Australia regarding the development of renewable energy as a response to the threat of climate change.

1.2. Research Aims and Objectives

To determine what factors have positively influenced, or oppositely constrained, developments in Australia this study set out to address two main aims. First, to investigate international and Commonwealth of Australia (henceforth termed the Commonwealth) factors influencing renewable energy developments in Australia Second, to assess whether or not the Commonwealth is serious about developing renewable energy resources in Australia. To fulfil these two aims this thesis will concentrate on addressing four main objectives.

1. To identify the international and Commonwealth processes that have stimulated the development of renewable energy policy, a chronological overview of the history of international and national sustainability and climate change processes from the 1970s to the present time will be traced. This will provide the context for the increasing demand of renewable energy alternatives to electricity supply. National processes will focus on the Commonwealth as opposed to State and Territory processes.
2. To place renewable energy policy developments in Australia into context by briefly discussing the extent of fossil fuel domination within the Australian economy and by identifying Commonwealth Government initiatives to advance renewable energy developments in Australia for the purposes of greenhouse gas abatement.
3. To identify and analyse key political issues and debates that have impacted on the development of Australia's renewable energy policy.
4. On the basis of information gathered through the abovementioned processes, evaluate whether or not the Commonwealth is serious about developing the country's renewable energy resources.

1.3. Methodology

To identify international and national processes that have influenced the development of the Commonwealth's renewable energy policy, literature and reports have been researched. There is a vast amount of information available so this thesis has focused on identifying the key processes and issues. To facilitate this and enable both international

and national initiatives to be viewed in context and in sequence, information regarding the key initiatives, the players and the main outcomes have been tabulated. The tables, presented in Chapter 2, have assisted in understanding the events that have occurred from the 1970s up until 2003, and have been a key research tool. The representation of information in this way provides a quick, comprehensive and easy reference guide to international and national developments that have influenced renewable energy policy developments.

The key political imperatives in Australia have been derived from Australian Commonwealth Government Parliamentary Debates or Hansards as they are commonly referred. Attention has been placed on Commonwealth actions, policies and debates, as opposed to State Government proceedings for two main reasons. First, it is the Commonwealth's responsibility to deal with Australia's affairs in relation to international activities (Commonwealth of Australia, 1900). Australia's response to climate change as a global challenge is, therefore, formulated at a Commonwealth level. Second, the development of a new industry that crosses State boundaries and requires international collaboration in technology acquisition and export, falls within the Commonwealth's Constitutional powers and demands Commonwealth attention in the form of political support, policy making and funding.

As a unique contribution to renewable energy debate in Australia, information from the Hansards has been gathered and analysed to determine the key issues that have influenced renewable energy policy development in Australia. From February 1997 until December 2003, 948 Parliamentary Debates were examined for both the House of Representatives and the Senate. The time frame for this analysis was based on the fact that Prime Minister J. Howard made a key address on the subject of greenhouse gas abatement measures and renewable energy developments in Australia in 1997. The address launched the renewable energy initiatives that are the focus of this thesis.

The Hansards were searched for key issues relevant to renewable energy and the two key imperatives: climate change and greenhouse gas emissions. Hansards for both the Senate and the House of Representatives were individually accessed through the Parliamentary website and were searched for key terms: renewable energy, climate change and greenhouse. Of the Hansards searched, 269 were identified as having some relevance to the subject of this thesis and were considered for further analysis. Specific portions of

the identified debates, and at times the entire debate, were copied and collated into a table that was used as a key reference source. This table was too large to incorporate into this thesis. However, all of the sources used are referenced according to the requirements of the Australian Guide to Legal Citation (Melbourne University Law Review Association Inc., 2002, 58) and are easily accessible on the web. The debates were thematically analysed for information with analysis of the key aspects of political discussion regarding renewable energy policy development in Australia presented in Chapters 4 and 5.

A guide to the Hansards, for both the House of Representatives and the Senate, was developed to identify the dates when the Houses were in session (Appendix 1). Specific dates are identified when issues pertaining to renewable energy, greenhouse gas and climate change were discussed. The title of the debate under which the discussion was held is provided and the page number given. The main speakers in the debate are also acknowledged. It is important to note two issues pertaining to the page numbers identified. First, the number given generally identifies the portion, but not the start of the speech considered of pertinence to this thesis. Second, since mid 2003 the Hansards have been accessed the day after, or within a few days, of the Parliamentary debate. As such the Hansards searched were still considered to be "Proof Issues" and it is possible that the page numbers, as well as some portions of the debate may have subsequently been corrected and changed. This problem does not affect information regarding debates prior to mid 2003.

Appendix 1, the *Commonwealth of Australia Hansard Guide to the Renewable Energy (Electricity) Act 2000, Climate Change and Greenhouse,* makes available a quick and easy mechanism for identifying when debates were held. It has provided an invaluable research tool for checking, cross referencing and providing an analytical overview of Commonwealth debates about renewable energy policy.

A preliminary analysis of Appendix 1 is given in Table 1-1. According to Parliamentary records a total of the 948 Parliamentary sessions were held between 1997 and 2003. Four hundred and eighty were held in the House of Representatives and 468 in the Senate. Of these, 269 had some discussion regarding renewable energy, climate change or greenhouse gas related issues. On these topics, the House of Representatives had 86 discussions while the Senate more than doubled the Representatives number with a total of 183 discussions. The difference between the numbers of discussions held by the two

Table 1.1 The Number of Days and the Number of Debates concerning Renewable Energy Related Issues in the House of Representatives and the Senate between 1997 and 2003 (ns=not sitting)

Number of days when the House of Representatives sat								
Month	1997	1998	1999	2000	2001	2002	2003	
Jan	ns	ns	ns	ns	ns	ns	ns	
Feb	11	ns	8	3	6	7	7	
Mar	10	14	11	8	9	7	11	
Apr	ns	6	ns	8	4	ns	ns	
May	7	7	4	6	5	7	7	
June	13	10	14	13	12	12	12	
July	ns	4	ns	ns	ns	ns	ns	
Aug	4	ns	10	8	12	8	8	
Sep	10	ns	10	4	8	8	8	
Oct	10	ns	8	9	ns	8	9	
Nov	8	8	4	10	ns	4	8	
Dec	6	7	4	4	ns	8	4	
TOTAL	79	56	73	73	56	69	74	480

Number of days when the Senate sat								
Month	1997	1998	1999	2000	2001	2002	2003	
Jan	ns	ns	ns	ns	ns	ns	ns	
Feb	11	ns	4	3	6	3	3	
Mar	12	14	11	8	9	7	11	
Apr	ns	6	9	8	4	ns	ns	
May	11	8	8	3	5	3	3	
June	10	7	8	12	8	8	8	
July	ns	9	ns	ns	ns	ns	ns	
Aug	4	ns	10	8	12	8	8	
Sep	10	ns	10	4	8	8	8	
Oct	10	ns	8	9	ns	8	13	
Nov	10	8	7	11	ns	7	6	
Dec	5	7	4	5	ns	8	4	
TOTAL	83	59	79	71	52	60	64	468

Number of debates held within the House of Representatives regarding renewable energy related issues								
Month	1997	1998	1999	2000	2001	2002	2003	
Jan	ns	ns	ns	ns	ns	ns	ns	
Feb	0	ns	0	0	1	0	1	
Mar	2	4	0	0	0	1	1	
Apr	ns	0	ns	0	0	ns	ns	
May	2	1	0	0	0	1	1	
June	9	1	0	2	0	3	4	
July	ns	1	ns	ns	ns	ns	ns	
Aug	2	ns	2	0	0	3	2	
Sep	4	ns	0	0	1	0	4	
Oct	2	ns	0	1	ns	0	1	
Nov	12	1	0	0	ns	0	7	
Dec	2	0	0	1	ns	2	4	
TOTAL	35	8	2	4	2	10	25	86

Number of debates held within the Senate regarding renewable energy related issues								
Month	1997	1998	1999	2000	2001	2002	2003	
Jan	ns	ns	ns	ns	ns	ns	ns	
Feb	1	ns	4	0	1	0	0	
Mar	5	7	1	2	2	0	3	
Apr	ns	3	2	0	1	ns	ns	
May	6	3	2	0	1	1	0	
June	22	4	4	1	3	0	2	
July	ns	2	ns	ns	ns	ns	ns	
Aug	3	ns	1	3	1	3	10	
Sep	8	ns	3	0	0	1	12	
Oct	3	ns	3	6	ns	1	13	
Nov	10	3	3	0	ns	1	6	
Dec	3	1	0	2	ns	1	5	
TOTAL	61	23	23	14	9	2	51	183

Houses is attributed to the fact that there is independent opposition in the Senate. The Australian Greens (henceforth termed Greens) and the Australian Democrats (henceforth termed Democrats) are absent from the House of Representatives, where there are very few independents. In the Senate, as will be discussed in Chapter 4, the Greens and the Democrats have initiated many debates on the subject of renewable energy, climate change and greenhouse gas emissions.

Since the end of 2003, when research for this thesis concluded, a number of key issues have become apparent in Parliamentary debates. For example, the release of the 2003 *Review of the Operation of the Renewable Energy (Electricity) Act 2000* in January and the presentation of a White Paper by Prime Minister Howard in June 2004. Due to time restraints and the need to set boundaries to the study it has not been possible to discuss and incorporate much of this new information. Nevertheless, it is considered that the study would be incomplete without referring to this information and, therefore where possible, information gathered post 2003 has been included.

1.4. Limitations

There are a number of limitations to this study that need to be identified to clarify the scope of the research undertaken.

International and national processes have been documented to identify key activities that have stimulated global interest in development of renewable energy alternatives. There is a wealth of information and literature relevant to this field so the focus of the research has been to pick key events and processes only. While all attempts have been made to ensure that the nature and sequence of these events and processes are complete, it cannot be conclusively demonstrated that this is the case because of the dynamic nature of the topic.

The scientific validity of climate change is not questioned. The topic has been controversial for a considerable period of time with a multiplicity of arguments and debate. Pursuing these arguments was not considered to be essential in assessing renewable energy policy development. As such the international scientific endorsement of the inevitability of climate change is accepted for the purposes of this thesis.

Independent of Commonwealth initiatives a number of States and Territories have initiated policies and processes that have been of considerable significance, for example New South Wales with the implementation of the Sustainable Energy Development Authority (SEDA). However, due to the international perspectives associated with climate change, the focus of the thesis has been on renewable energy developments within a Commonwealth framework. Therefore, only Commonwealth policies, initiatives and debates are addressed. State and Territory initiatives fall outside the scope of work undertaken.

A number of renewable energy initiatives, for example best practice schemes and development programs, have been instigated by the Commonwealth Government over the last decade. It was not the intention of this study to undertake a comprehensive identification and assessment of all the initiatives and while many, both prior to and post 1997, have been identified certainly not all have been. Details regarding the nature and relative success or failure of identified initiatives have also not been provided.

1.5. Significance of this Study

As the world's highest per capita greenhouse gas emitter, determining whether Australia will continue to be a carbon intensive economy or if it initiates actions towards being carbon free, is an important issue. Renewable energy could be a significant component of Australia's future energy mix and assist in the move to a more carbon free country.

Howlett and Ramesh (1995) in their studies on public policy point out that study on policy focuses on "what governments actually do" (Howlett & Ramesh, 1995, 3) and that it is the prerogative of governments to chose to do, or not to do. As an environmental manager, or as a business manager, a government's choice of policy as to what should be done, or not, is critical. With the Commonwealth Government's refusal to ratify the Kyoto Protocol; the commitment to fulfil the country's Kyoto greenhouse gas emission target; insecurity surrounding the nature and longevity of the sole mandatory response to global climate change in the form of the *Renewable Energy (Electricity) Act 2000* and its Mandatory Renewable Energy Target (MRET); and the lack of greenhouse gas abatement mechanisms; it is important to know the key issues that have determined Government

policy. For those pursuing an environmental agenda it is important to be aware of the differing political agendas.

1.6. Outline of Chapters

Chapter 1 provides a short background to the factors behind renewable energy development in response to climate change and energy demand. The research aims and objectives are presented together with the methodology that has been applied. The significance of the research is discussed and the limitations of the study are identified.

Chapter 2 traces the history of international and national sustainability and climate change processes from the 1970s to the present time. This provides a context for ensuing discussion of Australia's response to these issues in subsequent chapters. The key initiatives and main issues behind global climate change and sustainable development activities are chronologically presented. The influence of international agreements such as the Brundtland Report (1987), the Rio Conference (1992), the United Nations Framework Convention of Climate Change (1994), and the Kyoto Protocol (1997) are identified. Australia's recognition of this growing international knowledge, its subsequent commitments and initiatives, from the 1980s to the present, are also introduced in Chapter 2. An overview is presented of Australia's actions taken to address climate change and sustainable development including the formation of Australia's sole mandatory response to climate change in the form of the *Renewable Energy (Electricity) Act 2000.*

Chapter 3 identifies the specific initiatives undertaken by the Commonwealth Government to support developments in the field of renewable energy in Australia. As primary energy use in Australia has historically been dominated by fossil fuels it is necessary to briefly discuss the extent of the fossil fuel domination within the Australian economy in order to place renewable energy developments into context. The Commonwealth Government initiatives, focusing on measures identified in the landmark address *Safeguarding the Future: Australia's Response to Climate Change* (1997) have determined Prime Minister Howard's Government's, henceforth termed the Howard Government, response to climate change. The Commonwealth Government's

cornerstone of greenhouse abatement, the *Renewable Energy (Electricity) Act 2000* and the Mandatory Renewable Energy Target (MRET) it sets, are shown to be key initiatives.

Chapter 4 examines more closely the Hansard debates to form greater understanding of the complexities surrounding renewable energy developments. Internationally, Australia's position as the world's largest per capita greenhouse gas emitter, the country's decision not to ratify the Kyoto Protocol, and the relationship between Australia and the United States of America are discussed. Nationally, the establishment of the mandatory renewable energy target and the budget allocated to renewable activities are also addressed. Having assessed the major factors impacting on the renewable energy industry it becomes possible to explore the consequences of the Government's policies that are the subject of Chapter 5.

Chapter 5 provides a synthesis of the key factors that have influenced the Commonwealth Government's renewable energy policy position. On the premise that climate change is imminent, and that deep cuts in greenhouse gas emissions of up to 50-60 per cent by the end of the century are envisaged, it is posited that renewable energy alternatives to fossil fuel derived energy sources are the way of the future. Based on evidence gathered the thesis concludes that, under current political circumstances, Australia does not have a renewable energy policy and is not serious about developing its renewable energy resources.

2. The Growing Awareness of Sustainability and Climate Change

2.1. Introduction

Collaborative international initiatives to address Earth's deteriorating environmental conditions began with the Stockholm Conference in 1972. It was acknowledged at this conference that "the world as a whole must achieve a better balance among the major elements that determined the level and quality of life it could provide for its members-population and its distribution, available resources and their exploitation, and pressures placed on the life systems that sustained it" (United Nations Environment Programme, 1972b, np). Since the first United Nations (UN) Conference on the Human Environment in 1972 numerous gatherings, declarations and action plans have been initiated to address sustainable development, and one of the greatest envisioned threats to sustainability: global climate change.

Tracing the history of international and the Commonwealth's sustainability and climate change processes facilitates a greater understanding of the complexities faced by such undertakings. It also provides the background to the growth of renewable energy alternatives to fossil fuel electricity supply. Important to note, but not the focus of this thesis, is the influence the world oil crisis of the late 1970's had in substantially boosting renewable energy research and application.

The aim of this chapter is to provide a descriptive, chronological overview of both international and the Commonwealth's processes associated with the growing awareness and understanding of sustainable development and climate change. Inextricably intertwined, sustainable development and climate change are addressed in tandem, with focus given to climate change as the prime factor instigating renewable energy developments worldwide and in Australia. Starting in the 1970s, important events that precipitated international action and encouraged countries to recognise that sustainable development is an imperative, and that climate change is a global threat, are identified. These key initiatives, the players involved and the resulting outcomes have been tabulated in a time frame representation. Table 2-1 and Table 2-2 enable international

Table 2.1 An Overview of International Climate Change Processes from the 1970s to 2003

Time Frame	1970's	1980's	1987	1988	1989	1990	1991	1992	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Key Initiatives	(a) 1972 Stockholm Conference	(a) Vienna Convention for the Protection of the Ozone Layer accepted, September 1985	(a) Our Common Future (the Brundtland Report)	(a) World Conference on the Changing Atmosphere, Implications for Climate Change, Toronto, Canada, June	(a) The Declaration of the Hague calls for a Convention on Climate Change	(a) IPCC First Assessment Report, June	(a) Global Environment Facility (GEF) established	(a) Intergovernmental Negotiating Committee adoption of final text of FCCC, May	(a) UNFCC came into force, March	(a) Conference on Climate Change in Manilla, Phillipines leads to the Manilla Declaration, February	(a) COP2, Geneva, Switzerland, resulting in the Geneva Declaration	(a) Earth Summit II, New York, USA, June	(a) COP 4, Buenos Aires, Argentina, November, resulting in the Buenos Aires Plan of Action	(a) COP 5, Bonn, Germany, November	(a) COP 6, The Hague, Netherlands, November	(a) IPCC Third Assessment Report	(a) World Summit on Sustainable Development (WSSD), Johannesburg, September	(a) COP 9, Milan, Italy, November
	(b) 1972 United National General Assembly Resolution 2997	(b) Conference on Climate in Villach, Austria, October 1985	(b) Montreal Protocol on Substances that Deplete the Ozone Layer	(b) Intergovernmental Panel on Climate Change (IPCC) established, October	(b) Male Declaration on Global Warming and Sea Level Rise, November	(b) Second World Climate Conference, Geneva		(b) The United Nations Framework Convention on Climate Change (UNFCCC) signed at the UN Conference on Environment and Development (UNCED), the so-called "Earth Summit", in Rio de Janeiro, Brazil		(b) First Conference of Parties (COP 1), Berlin, Germany, resulting in the Berlin Mandate, March		(b) COP 3, Kyoto, Japan, December			(b) Malmo Ministerial Declaration	(b) COP 7, Marrakesh, Morocco, November	(b) COP 8, New Delhi, India, October	
	(c) First World Climate Conference, Geneva, February 1979 - led to the establishment of the World Climate Programme (WCP)				(c) Ministerial Conference on Atmospheric Pollution and Climate Change results in Noordwijk Declaration on Atmospheric Pollution Noordwijk, Netherlands	(c) Intergovernmental Negotiating Committee (INC) formed, December		(c) Adoption, at the Earth Summit, of Agenda 21 and the Rio Declaration		(c) IPCC Second Assessment Report released at IPCC11, Rome, Italy, December		(c) Nairobi Declaration						
Players	(a) United Nations Environment Programme (UNEP)	(a) UNEP	(a) World Commission on Environment and Development	(a) UNEP, Government of Canada	(a) Initiated by Dutch, French and Norwegian Governments 24 Countries and many excluded	(a) IPCC Working Groups	(a) World Bank, UNEP and the UN Development Programme (UNDP)	(a) 42 countries	(a) 188 Parties	(a) Asia Pacific Leaders	(a) UN, Annex 1 and 11 Parties	(a) UN	(a) UN, Annex 1 and 11 Parties - representatives from 170 governments	(a) UN, Annex 1 and 11 Parties - representatives from 166 governments	(a) UN, Annex 1 and 11 Parties - representatives from 178 governments	(a) UNEP, WMO	(a) UN	(a) UN and 188 parties
	(b) United Nations	(b) WMO and UNEP	(b) UNEP	(b) WMO, UNEP	(b) 15 Island Nations sign	(b) WMO		(b) 153 countries out of 161 attending UNCED signed the UNFCCC		(b) UN, Annex 1 and 11 Parties		(b) UN, Annex 1 and 11 Parties			(b) UN Ministers	(b) Representatives from 172 governments and 234 IGOs	(b) Participants from 167 Parties, three observer states, and 213 IGOs, NGOs, and other observer organizations	
	(c) World Meteorological Organization (WMO)				(c) Representatives from 67 countries, 11 international organisations and the Commission of the European Community	(c) UN General Assembly - Resolution 45/212		(c) 161 countries		(c) WMO, UNEP		(c) UNEP						
Outcomes	(a) Established an Action Plan for the Human Environment	(a) Increasing scientific evidence of human interference with the climate system - a treaty to address ozone depletion	(a) Concept of sustainable development	(a)Toronto agreement aimed to cut CO_2 emissions by 20% by 2005, using 1988 as a base level	(a) 23 Countries to work through UN to control climate change Advocates the establishment of international decision making mechanisms	(a) Recognised the climate change threat - emissions from human activities were increasing greenhouse gases - called for a global treaty	(a) To fund projects that have global environmental benefits, in climate change, biodiversity, protection of the ozone layer and international waters	(a) UNFCCC drafted	(a) Came into force	(a) Developed countries called to reduce emissions to 20% less than 1990 emissions by 2005	(a) Stressed IPCC report findings Identified that most countries were unlikely to stabilise emissions at 1990 levels by 2000 Agreed to accelerate negotiations and develop a protocol to encompass targets and time frames	(a) Reaffirm commitment to and an acceleration of Agenda 21	(a) Deadlines established for finalising details of the Protocol		(a) Financial support and technology transfer to help developing countries contribute to global action on climate change outlined	(a) Providing "new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities" (IPCC, 2001)	(a) Delhi Ministerial Declaration reconfirmed commitment to sustainable development Calls for a renewable energy action agenda	(a) Reaffirmed the threat of climate change
	(b) Institutional and financial arrangements for international environmental cooperation	(b) Increased awareness of climate change Further research required into causes and effects	(b) The elimination of ozone-depleting substances is its main objective	(b) Recognised the needs of policymakers for authoritative and up-to-date scientific information	(b) Calling industrialised nations to control greenhouse gas emissions	(b) Scientific consensus that action on climate change is required No agreement on a strategy to prevent global warming Emission reduction targets negotiated Formation of Alliance of Small Island States (AOSIS)		(b) Convention opened for signature Greenhouse gas emission targets to be stabilised at 1990 levels by 2000		(b) Aimed at strengthening developed countries commitment without binding targets Concept of differentiated targets accepted Agreement that targets for reducing greenhouse gases will be reached in 1997 in Kyoto Adopted guideline's for national greenhouse gas inventories		(b) Agreement on the text of the Kyoto Protocol Legally binding constraints on greenhouse gas emissions and innovative "mechanisms" aimed at cutting the cost of curbing emissions			(b) Reinforced commitment to sustainable development action	(b) Rules supporting the Kyoto Protocol and agreement on emissions reporting and data verification	(b) Agreement on rules and procedures for CDM and guidelines for reporting and reviewing, guidance to develop a special fund for least developed countries and established the New Delhi work programme for promoting education, training, and public awareness	
	(c) Focused on how climate change might impact human activities - called for research into climate change				(c) Calling on industrialised countries to support the limiting of CO2 emissions	(c) To develop a framework convention for signing at the Rio Conference to be held in June 1992		(c) The Earth Summit a global, significant first in the drive for environmental sustainability Agenda 21 providing a framework of actions for the development of environmentally sound and ecologically sustainable decision-making at all levels The declaration stating the principles of sustainable development		(c) Authoritative findings reviewed by 2500 climate scientists worldwide		(c) Reaffirmed commitment to Resolution 2997 and Agenda 21 and detailed the role and mandate of UNEP						

Sources (Kay, 1997, Fridtjof Nansen Institute (2003), numerous United Nations documents)

and Commonwealth initiatives, respectively, to be viewed in context and in sequence thereby providing a quick, comprehensive and easy reference guide to developments that have influenced renewable energy policy. For example, in Table 2-1 the first key initiative in the 1970s was (a) the Stockholm Conference, the main players involved were (a) the United Nations Environment Programme and the main outcomes were (a) an Action Plan for the Human Environment was established. This information provides the broader perspective and background behind efforts to establish renewable energy sources as alternatives to fossil fuel for electricity generation.

2.2. Sustainability and the International Climate Change Process 1970 – 2003

The first UN Conference on the Human Environment was held in Stockholm, Sweden in June 1972. The intention of the conference was to consider "the need for a common outlook and for common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment" (United Nations Environment Programme, 1972a). The outcomes of the conference were the Stockholm Declaration on the Human Environment; an Action Plan for the Human Environment; a proposal for the development of an Environment Fund; and the initiation of organisational and financial mechanisms to undertake the identified actions.

Priorities requiring international and immediate action included the following:

> water supplies, ocean and sea pollution, and the urban crisis ... the need for understanding and controlling the changes man produced in the major ecological systems; the need for accelerating the dissemination of environmentally sound technologies and for developing alternatives to existing harmful technologies; the need to avoid commitment to new technologies before adequately assessing their environmental consequences; the need to encourage broader international distribution of industrial capacity; and the need to assist developing countries to minimize environmental risks in their development strategies (United Nations Environment Programme, 1972b(Section 40)).

Recommendations made in the Stockholm Declaration, that international financial and institutional arrangements are established to deal with issues pertaining to the environment, came into effect with the acceptance of the Resolution 2997 at the Twenty Seventh session of the UN General Assembly in December 1972. A Governing Council of the UN Environment Programme (UNEP) was established, together with an

Environment Secretariat, an Environment Fund and an Environment Co-ordination Board (United Nations General Assembly, 1972).

Seven years later, in 1979, the First World Climate Conference organised by the World Meteorological Organisation (WMO) was held. It was the first international, scientific conference to address climate change issues and how climate change might impact on human activities. The burning of fossil fuels, land use change and deforestation were identified as the key reasons for increasing carbon dioxide in the atmosphere. Following this landmark conference, the World Climate Programme was established emphasising the need for research into climate change and its possible impacts. This led to a number of international conventions and treaties on climate change that occurred in the 1980s. For example, under the auspices of UNEP the Vienna Convention for the Protection of the Ozone Layer was drafted in 1985 and came into force in 1988. While not directly related specifically to climate change this convention was significant in terms of what was to come for climate change initiatives. Taking four years to develop and find agreement, the Convention focused on research, international cooperation and information exchange and "set an important precedent. For the first time nations agreed in principle to tackle a global environmental problem before its effects were felt, or even scientifically proven" (United Nations Environment Programme, 2003, np).

Another substantive development occurred in 1987 with the publication of *Our Common Future*, the UN's World Commission on Environment and Development's (World Commission on Environment and Development, 1987) report. The report changed environmental thinking worldwide. Highlighting global warming as one of the world's major challenges Brundtland made the situation very clear:

> The burning of fossil fuels puts into the atmosphere carbon dioxide, which is causing gradual global warming. This 'greenhouse effect' may by early next century have increased average global temperatures enough to shift agricultural production areas, raise sea levels to flood coastal cities, and disrupt national economies. Other industrial gases threaten to deplete the planets protective ozone shield to such an extent that the number of human and animal cancers would rise sharply and the oceans' food chain would be disrupted (World Commission on Environment and Development, 1987, 2)

Pioneering the concept of sustainable development, "to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own

needs" (World Commission on Environment and Development, 1987, 8), Brundtland was forthright in stating that future generations were already compromised.

> But the results of the present profligacy are rapidly closing the options for future generations. Most of today's decision makers will be dead before the planet feels the heavier effects of acid precipitation, global warming, ozone depletion, or widespread desertification and species loss. Most of the young voters of today will still be alive. In the Commissions hearings it was the young, those who have the most to lose, who were the harshest critics of the planet's present management (World Commission on Environment and Development, 1987, 8).

The Brundtland report identified the development of "low energy paths based on renewable energy" as the way forward and stated that renewable energy solutions "should form the foundation of global energy structure during the 21st century" (World Commission on Environment and Development, 1987, 15). The move towards renewable energy, away from fossil fuel generated energy that has been the status quo for centuries, was now in its infancy.

The Toronto Agreement followed in 1988, issued a "call for action to governments, industry and international organisations" (United Nations Environment Programme, 1993b, np) and made a number of progressive recommendations including the following:

- an initial global goal of reducing of carbon dioxide (CO_2) emissions by 20% of 1988 levels by the year 2005;
- a ten per cent improvement in energy efficiency by 2005;
- the introduction of technological changes to facilitate these goals; and
- the preparation of an international treaty for the protection of the atmosphere.

It was this call to action to develop an international treaty that initiated the Intergovernmental Panel on Climate Change.

The first Intergovernmental Panel on Climate Change (IPCC) was established in 1988 by UNEP. The role of the IPCC was:

> To assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation (United Nations Environment Programme, 1988, 1).

The three IPCC working groups and a national greenhouse gas inventory task force focused on examining "the scientific aspects of the climate system and of climate change", addressing "the vulnerability of human and natural systems to climate change,

the negative and positive consequences of climate change, and options for adapting to them" and assessing "options for limiting greenhouse gas emissions and otherwise mitigating climate change, and economic issues" (United Nations Environment Programme, 1988, 5). Their four volume first assessment report "inspired governments to establish the Inter Governmental Negotiating Committee" (United Nations Environment Programme, 1988, 6) in 1990.

The following year in 1989, the Declaration of The Hague called "upon all states to participate in the development of a framework convention on climate change" (United Nations Environment Programme, 1993b, np) and establish decision making and enforcement mechanisms within the UN structure to effectively address climate change. Signatories at The Hague specified the nature of the proposed UN structure, however, it was the newly appointed Inter Governmental Negotiating Committee (IGNC) that took up the challenge and made a significant contribution to the climate change process by drafting the United Nations Framework Convention on Climate Change (UNFCCC). The Convention was signed by 154 nations, including Australia, at the UN Conference on Environment and Development, the Earth Summit, held in Rio de Janeiro, Brazil in 1992. At this same conference Agenda 21, a comprehensive plan of action drafted to achieve environmental, economic and social development according to principles of sustainability, was adopted.

The UNFCCC, a non binding agreement, came into force in 1994 with the objective of:

> Stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner (United Nations, 1992, 9Article 2).

The UNFCCC (1992) recognised the different responsibilities of nations and regions and obtained commitment from countries to undertake the following:

- develop and publish national inventories of greenhouse gas emissions and sinks, and "submit reports – known as "national communications" – on the action they are taking to implement the Convention" (Climate Change Secretariat, 2002, np);
- formulate, implement and update national and regional programmes to mitigate and adapt to climate change "including measures to address sources of greenhouse gas emissions and to protect and enhance so-called carbon "sinks"

and "reservoirs" (forests and other natural systems that remove carbon from the atmosphere)" (Climate Change Secretariat, 2002, np);

- promote, develop and apply technologies, practises and processes to reduce or prevent emissions in all sectors including energy, transport and industry;
- promote sustainable management of sinks and reservoirs of greenhouse gases;
- take climate change considerations into relevant social, economic and environmental policy development and actions to minimise and mitigate adverse effects of climate change;
- promote and cooperate in research and the establishment of data archives to facilitate an understanding of climate change and its consequences;
- promote education and awareness of climate change and encourage participation in all processes; and
- communicate with the Conference of Parties (COP).

While Governments had been rallied to action at the Rio Conference similar initiatives had taken place within the business community. In 1991, the Business Council on Sustainable Development had been established with the aim of involving the private sector in sustainability issues and providing a 'voice for businesses' at the Rio Earth Summit in 1992. Recognising the need for a carbon constrained future the World Business Council on Sustainable Development (WBCSD) Energy and Climate Project continues to investigate ways for business "to address global warming within a sustainable development framework. By devising practical mechanisms, measurement tools, and market-based solutions, the project helps companies reduce the impact of their operations today" (World Business Council on Sustainable Development, 2004, np). The WBCSD today is a coalition of 170 international companies sharing a commitment to the environment and to the principles of sustainable development.

The annual gathering of scientists, policy and decision makers monitoring climate change and negotiating the implementation of the UNFCCC became known as the Conference of Parties (COP) and it was the developed countries, termed the Annex 1 Parties, who were to take the lead in addressing climate change. The commitments by the Annex 1 Parties included adopting national policies and mitigation measures to limit anthropogenic emissions and enhance greenhouse gas sinks and reservoirs. Information on the nature and extent of these policies and measures would regularly be provided to the COP with

"the aim of returning individually or jointly to their 1990 levels these anthropogenic emissions of carbon dioxide and other greenhouse gases" (United Nations, 1992, 12). Information was to be reviewed by the COP and appropriate action would be undertaken accordingly. Annex 1 countries committed to calculate emissions by sources and removals by sinks using best available scientific knowledge. COP was to agree on methodologies and maintain a regular review.

It should be noted that the UNFCCC made specific mention of countries, particularly developing countries, which may be adversely affected by the implementation of measures required by the convention.

> This applies notably to Parties with economies that are highly dependent on income generated from the production, processing and export, and/or consumption of fossil fuels and associated energy-intensive products and/or the use of fossil fuels for which such Parties have serious difficulties in switching to alternatives (United Nations, 1992, 15 Article 4).

Holding their first conference in 1995 in Berlin, Germany, COP1 called for cooperation among all countries, recognised the legitimate needs of developing countries to achieve economic development and acknowledged that the largest proportion of greenhouse gases originated from the developed countries. Countries differentiated responsibilities, capabilities and social and economic conditions were also acknowledged. COP1 initiated the process of setting targets asking countries to "set quantified limitation and reduction objectives within specified time-frames, such as 2005, 2010 and 2020, for their anthropogenic emissions by sources and removals by sinks of greenhouse gases" (United Nations, 1995, 5). These decisions were encapsulated in the Berlin Mandate. This mandate also established a process of review to strengthen UNFCCC commitments.

The Second Assessment Report from the IPCC was written in 1995 and presented to COP2 in Geneva, Switzerland in 1996. Considered to be scientifically sound, authoritative and comprehensive (United Nations, 1996, 9) this report provided the technical basis for decisions leading up to the COP3. Difficulties associated with the multilateral consultative process, designed to resolve issues pertaining to climate change according to Article 13 of the UNFCCC, were documented at this conference. It was also agreed that there would be an acceleration of negotiations to develop a protocol to encompass legally binding targets and time frames (Fridtjof Nansen Institute, 2003).

Meanwhile, the UN was also making progress with its sustainability agenda. The Nairobi Conference in 1997 confirmed the UN commitment to both the General Assembly Resolution 2997 (XXVII) and Agenda 21 and revitalised initiatives "[t]o analyse the state of the global environment and assess global and regional environmental trends, provide policy advice, early warning information on environmental threats, and to catalyse and promote international cooperation and action, based on the best scientific and technical capabilities available" (United Nations Environment Programme, 1997, np). The conference was followed by a special session of the UN General Assembly to review the implementation of Agenda 21. The Earth Summit+5, held in June 1997 in New York, again sought commitment for Agenda 21.

Later in 1997, COP3 was held in Kyoto, Japan. This milestone conference, after which the Kyoto Protocol became named, further elaborated on the commitments of Annex 1 Parties, including implementing policies and measures to reduce the effects of human activity on climate change. Participants were urged to undertake the following:

- enhance energy efficiency where appropriate;
- protect and enhance greenhouse gas sinks and reservoirs through sustainable forest management practices, afforestation and reforestation;
- promote sustainable forms of agriculture;
- undertake "research on, and promotion, development and increased use of, new and renewable forms of energy, of carbon dioxide sequestration technologies and of advanced and innovative environmentally sound technologies" (United Nations, 1997, 8);
- phase out financial incentives and subsidies to all greenhouse gas emitting sectors;
- encourage reform aimed at policies and measures promoting the limitation or reduction of greenhouse gases;
- undertake measures to reduce emissions in the transport sector; and
- limit or reduce methane emissions through recovery and use in waste management (United Nations, 1997).

According to Article 3 of the Kyoto Protocol, all countries would reduce their greenhouse gas emissions by "at least 5 per cent below 1990 levels in the commitment period 2008 to 2012" (United Nations, 1997, 3) and would have shown progress by 2005. Explicit

targets for the industrialised countries were established in what became known as the Annex B limits (see Table 2-3). 1990 was identified as the historical base year from which implementation of its commitments would be measured. For those countries with economies in transition the base period of 1990 could be different (see Table 2-3).

In addition, the Protocol prescribed three "flexibility mechanisms" to help a country to achieve its targets: emissions trading, joint implementation (JI) and the clean development mechanism (CDM). "These aim to maximise the cost-effectiveness of climate change mitigation by allowing Parties to pursue opportunities to cut emissions, or enhance carbon sinks, more cheaply abroad than at home" (Climate Change Secretariat, 2002, 28).

The Kyoto Protocol identified the measures that were required to combat climate change but did not determine the rules by which these measures would operate. "Although 84 countries signed the Protocol indicating that they intended to ratify, many were reluctant to actually do so and bring the Protocol into force before having a clearer picture of the treaty's rulebook" (Climate Change Secretariat, 2002, 6). Between 1998 (COP4 held in Buenos Aires) and 2001 (COP6 in Bonn) intense negotiations were held to establish the rules for the Kyoto Protocol. Eventually adopted at COP7, in what was called the Marrakech Accord (United Nations, 2001), the rules for moving forward were legally specified thereby opening the way for the Kyoto Protocol to come into force. Capacity building in developing countries, regarding the implementation of the UNFCCC and participation in the Protocol, was paramount. Agreement on reporting and verifying greenhouse gas emissions data and information was a focus to support the practical implementation and auditing of the Protocol.

In parallel, at all subsequent COPs, the call to launch projects that developed renewable energy technologies, established higher energy efficiency, and decreased deforestation continued to be heard, as was the need for greater cooperation and solidarity between developed and developing countries.

Table 2-3 Annex B Emission Limits Per Country as Established in the United Nations Framework Convention on Climate Change - Kyoto Protocol

Party	Quantified emission limitation or reduction commitment (Percentage of base year or period)
Australia	108
Austria	92
Belgium	92
Bulgaria*	92
Canada	94
Croatia*	95
Czech Republic*	92
Denmark	92
Estonia*	92
European Community	92
Finland	92
France	92
Germany	92
Greece	92
Hungary*	94
Iceland	110
Ireland	92
Italy	92
Japan	94
Latvia*	92
Liechtenstein	92
Lithuania*	92
Luxembourg	92
Monaco	92
Netherlands	92
New Zealand	100
Norway	101
Poland*	94
Portugal	92
Romania*	92
Russian Federation*	100
Slovakia*	92
Slovenia*	92
Spain	92
Sweden	92
Switzerland	92
Ukraine*	100
United Kingdom of Great Britain and Northern Ireland	92
United States of America	93

* Countries that are undergoing the process of transition to a market economy.
Source: (UNFCCC, 1997, 23).

With the gathering of scientists and decision makers occurring annually at the COP, pursuing more influential high level political support was established through the gathering of the world's environmental ministers. The First Global Ministerial Environment Forum was held in Malmö, Sweden in May 2000. At this meeting concern regarding the discrepancy between cooperating countries commitments and resulting actions were voiced. The establishment of goals and targets in relation to sustainable development and the adoption of national sustainable development strategies were urged. It was stated that "[t]he mobilization of domestic and international resources, including development assistance, far beyond current levels is vital to the success of this endeavour [of sustainable development]" (United Nations Environment Programme, 2000b, np).

In 2001, the IPCC's Third Assessment Report was published providing a "comprehensive and up to date assessment of the policy relevant scientific, technical and socio-economic dimensions of climate change" (World Meteorological Organisation and United Nations Environment Programme, 2003, np). In a *Summary Report for Policy Makers (2001)* by the IPCC's Working Group I they provided evidence of a "warming world" including the following:

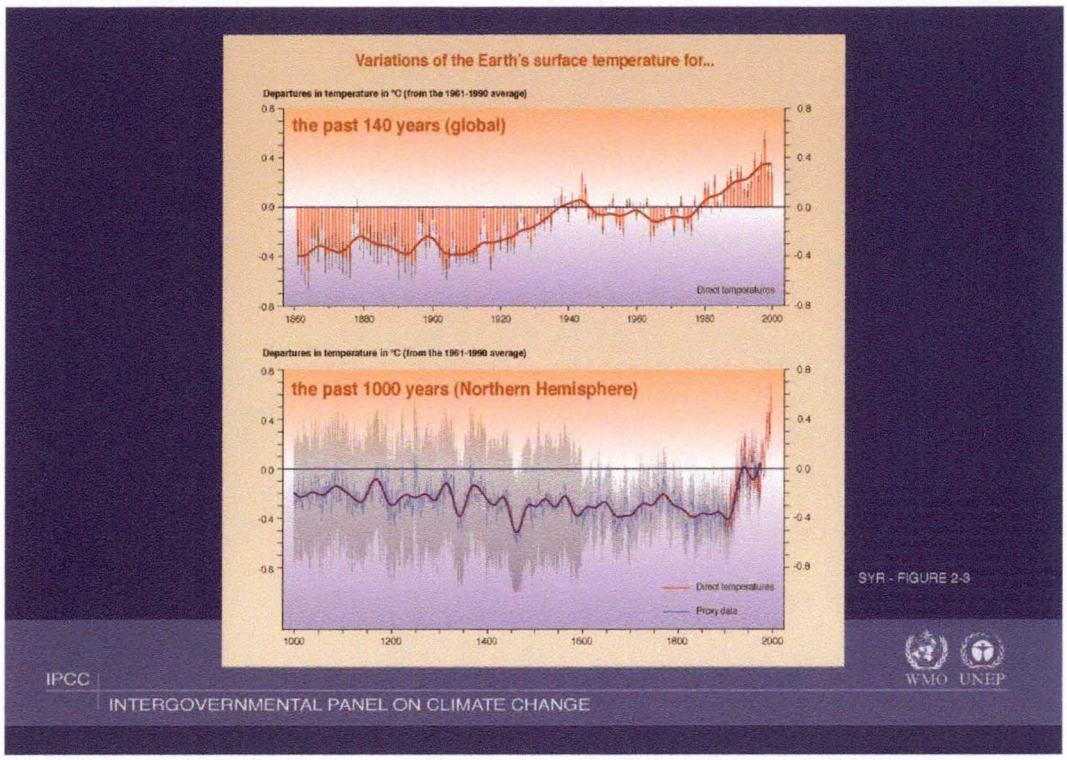
- an increase of approximately 0.6°C in global average surface temperatures in the 20th century;
- rising temperatures in the lower atmosphere (eight kilometres) during the last 40 years;
- a decrease in the extent of ice and snow cover; and
- a global average increase in sea level of between 10 and 20 centimetres.

Figure 2-1 presents a graph from the Third Assessment Report showing variations of the Earth's surface temperature over the last 140 years and the last millennium.

The World Summit on Sustainable Development (WSSD), held in Johannesburg, South Africa in 2002 reconfirmed the global challenge of climate change, stating that the adverse effects were already evident and that natural disasters have become more frequent and devastating (United Nations Division for Sustainable Development, 2002). The WSSD once again confirmed a common commitment to sustainable development and under the guidance of UN Secretary-General Kofi Annan proposed five key areas for particular focus: Water, Energy, Health, Agriculture and Biodiversity (WEHAB). At this

conference a coalition of Governments and businesses initiated a partnership agreement to develop renewable and energy efficiency systems.

Figure 2-1 Variations of the Earth's Surface for the past 140 years (global) and the past 1000 years (Northern Hemisphere)



Source: (World Meteorological Organisation and United Nations Environment Programme, 2003, np).

The partnership named the Renewable Energy and Energy Efficiency Partnership (REEEP) was launched in October 2003 by France, Germany and the United Kingdom:

> To address the challenge of sustainable development and reducing greenhouse gas emissions we must drastically improve energy efficiency in all sectors of the economy and increase the share of renewable and non-greenhouse emitting energies in our energy system. This requires promoting innovation and the diffusion of the current best available technologies in these fields and working towards technological breakthroughs. We are therefore pleased to have participated in the launch of the Renewable Energy and Energy Efficiency Partnership (REEEP) in London, as a way to work together towards more sustainable energy systems (United Kingdom Department of Environment Food and Rural Affairs, 2003, np).

In 2004 an international conference on renewable energies will be held in Bonn, Germany entitled International Conference for Renewable Energies *REEEP - Moving Forward, Bonn and Beyond.*

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Still in 2002, COP8 was held in New Delhi and reinforced the link between sustainable development and climate change. The Delhi Ministerial Declaration, signed by 170 countries, reiterated the need to ratify the Kyoto Protocol and promoted technological solutions to adapting to climate change including:

- technological advancement through research and development;
- an increase in renewable energy resources; and
- promotion of the transfer of greenhouse emission reduction technologies (United Nations, 2002).

With ten years to go to meet the promised Kyoto emission targets it was made clear that considerable work was still required to reduce greenhouse gases. However, progress was made in two main areas. First, COP8 finalised the operation of the Protocol's CDM. The way became clear for channelling "private sector investment into emissions reduction projects in developing countries" (United Nations, 2002, np). This action facilitates development in developing countries and at the same time enables developed countries to obtain credits against their Kyoto targets (Environment News Service, 2002). A second accomplishment was the establishment of international, credible and comparable procedures for reporting and reviewing emissions data. This action is considered to have brought integrity and increased quality to the Kyoto agreement.

COP9 was held in Milan, Italy on 1-12 December 2003. It had been anticipated that Russia would ratify the Kyoto Protocol thereby bringing it into force. This has not yet occurred, however, there was "agreement that climate change remains the most important global challenge to humanity and that its adverse effects are already a reality in all parts of the world" (United Nations, 2003, np).

The anticipation that the Kyoto Protocol would be ratified by COP9 did not materialise. Article 25 of the Kyoto Protocol states that to enter into force the Protocol requires 55 Parties to the UNFCCC to ratify the Protocol, "incorporating Parties included in Annex I which accounted in total for at least 55 per cent of the total carbon dioxide emissions for 1990" (United Nations, 1997, 19). To date 119 countries have ratified, acceded, approved or accepted the Protocol accounting for 44.2 per cent of emissions. The slow progress in ratifying the Protocol has been attributed to the United States of America (USA) withdrawing from the Kyoto Protocol in 2001, and the petroleum producing countries.

2.3. The Commonwealth of Australia's Involvement in International Negotiations

Australia has a long history of participation in international sustainability and climate change initiatives. Taking pride in being a 'good global citizen' the country has been considered as one of the developed nations with the will, knowledge, and technological skill to provide innovative solutions to environmental issues.

In 1973, under Prime Minister Hon. E.G. Whitlam (Australian Labor Party – ALP), the Commonwealth signed the UN General Assembly Resolution 2997 and drew lots to become a Council Member for three years in the Governing Council of UNEP. Concomitant involvement at the political and decision-making level was scientific participation. Ratification of the Vienna Convention and the Montreal Protocol took place in 1987 and 1989 respectively under Prime Minister Hon. R.J.L. Hawke (ALP). The Hague Declaration was signed in 1989 and in 1990 the Commonwealth Government adopted the Toronto Target as its greenhouse gas Interim Planning Target. The Toronto Target intended to stabilise and reduce greenhouse gas emissions "by 20% of 1988 levels by the year 2005" (United Nations Environment Programme, 1993, np). Considered to be an extremely ambitious target, it should be noted that Australia qualified its commitment.

> An important caveat was included in this target. This stated that measures which would have net adverse economic impacts nationally or on Australia's trade competitiveness would not be implemented in the absence of similar action by major greenhouse gas producing nations. Actions would be taken if benefits were realised in addition to the greenhouse gas emission reduction benefits, for example energy conservation. This became known as the 'no regrets' strategy (Kay, 1997, np).

In 1992 Australia became the ninth country to sign the UNFCCC as an Annex 1 country. One of the main aims of the Convention was to stabilise greenhouse gas emissions at 1990 levels by the year 2000. As part of the undertaking to lead and respond to climate change the Prime Minister Hon. P.J. Keating's Labor Government adopted both a National Strategy for Ecologically Sustainable Development (NSESD) and a National Greenhouse Resource Strategy (NGRS).

The NSESD facilitated a coordinated approach to ecologically sustainable development between all state and local governments. Chapter 8 of NSESD sets out the challenge for the energy use, energy production and transport sectors as follows:

> To limit production of harmful emissions without reducing economic efficiency, improve the availability, efficiency and affordability of alternative energy sources, and improve the technical and economic efficiency of urban and non-urban transportation (Ecologically Sustainable Development Steering Committee, 1992, np).

Amongst the many objectives determined by the NSESD to address the abovementioned challenge there are some objectives that refer directly to renewable energy sources. These are considered in more detail in Table 2-4. The promotion of alternative renewable energy sources through research, development, demonstration and industry support became a Government commitment. The more definitive National Greenhouse Strategy (NGS), established subsequent to the first NGRS, further enhanced this commitment. In conjunction with contributions from the Local Government Association, industry and communities, the Commonwealth Government in 1992 launched the NGRS which outlined the strategic framework by which Australia would combat global climate change. The four areas of focus for the strategy were:

- improving the knowledge bases of climate change;
- monitoring, evaluation and review of information;
- identification of sectoral mitigation measures; and
- community involvement (Australian Government, 1992).

The NGRS endorsed the Toronto Target as Australia's Interim Planning Target to stabilise and reduce greenhouse gas emissions "by 20% of 1988 levels by the year 2005" but relied on voluntary measures and the "no regrets" strategy. This meant "that the measures taken have net benefits (or at least no net cost) in addition to addressing the enhanced greenhouse effect" (Kay, 1997, np).

One of Australia's commitments to UNFCCC was fulfilled in 1994 with the publication of *Australia's First National Communication on Climate Change*. Included in this report was the first greenhouse gas inventory which identified that a 14% increase in carbon dioxide emissions by 2000 was predicted. In the same year Australia submitted its first National Report on Sustainable Development to the UN.

Table 2-4 Objectives Established by the National Strategy for Ecologically Sustainable Development (1992) Specifically Relating to Renewable Energy

Objective No.	Objective	Government Commitment
8.1	• To limit harmful emissions arising from energy production and distribution wherever economically efficient, and to promote alternative energy sources.	• Strengthen energy research, development and demonstration (RD &D), particularly on renewable energies and energy efficiency, including a flexible approach to industry support for pre-competitive RD & D. • Develop a national program to facilitate the use of renewable energy for stand-alone power supply systems for remote and rural areas. In the development of this program, consideration will be given to the option of meeting part of the cost (up to some ceiling) of installing renewable energy based stand-alone power supply systems. • Through ANZMEC (Australia and New Zealand Minerals and Energy Council), monitor and report annually on the impact of reforms of energy utilities on the viability of renewable energy systems on pipeline development issues. • Consider the scope and feasibility of adopting the principles and policies developed by the Victorian Renewable Energy Authority and Energy Education Centre to promote the efficient use of renewable energy.
8.2	• To improve the energy efficiency of residential buildings and domestic appliances; and to influence householders to become more economical in their use of energy, and to switch to energy sources with lower greenhouse gas emissions.	• Encourage wider use of renewable energy sources, paying particular attention to removing barriers that discriminate against their use.
8.3	• To influence industries and businesses to adopt behaviour, practices, technology and equipment that make them minimise their energy use; or lead them to switch to energy sources with lower greenhouse gas emissions.	• Through ANZMEC, investigate the scope to promote commercialisation of renewable and efficiency technologies.

Source: (Ecologically Sustainable Development Steering Committee, 1992).

In order to decrease greenhouse gas emissions, in 1995 the Commonwealth Government adopted a "joint voluntary initiative between the government and industry to abate greenhouse gas emissions" (Australian Greenhouse Office, 2003, np). Known as the Greenhouse Challenge Program (GHC) the intention of the challenge was to demonstrate that voluntary action could yield significant greenhouse results with an expected reduction of up to 16 million tonnes by 2010. The objective of the agreement was "to ensure industries and firms seek continuous improvements in energy and process efficiency, achieve maximum practicable greenhouse abatement performance, and at the same time, enhance their competitive advantage. It is also intended to encourage the development of long term sustainable strategies in response to climate change concerns" (Australian Greenhouse Office, 1999, 15).

A significant shift in Australia's climate change policies occurred in 1996 with the election of a Coalition Liberal/National Party Government under Prime Minister Hon. J.W. Howard. The NGRS was reviewed and the new NGS was implemented in 1998 outlining how Australia's international commitment would be met (Commonwealth of Australia, 1998). The guiding principles behind implementation of the strategy were identified:

- the need for Australia to have a strategic and comprehensive greenhouse response which is tailored to address our particular national interests and circumstances;
- the need to integrate greenhouse considerations with other government commitments;
- the pursuit of greenhouse action consistent with equity and cost-effectiveness and with multiple benefits;
- recognition of the importance of partnerships between governments, industry and the community in delivering an effective greenhouse response;
- the need for action to be informed by research (Commonwealth of Australia, 1998, viii).

Three main goals were established for the strategy. First, limiting greenhouse gas emissions and meeting Australia's international commitments. Second the strategy aimed at developing greater knowledge and understanding of greenhouse issues in Australia. Third, developing measures enabling Australia to adapt to the inevitabilities of climate change had to be initiated. An Implementation Planning Group (IPG) was established consisting of representatives from the Commonwealth, State and Territory Government's as well as Local Government. The IPG's brief was to coordinate the implementation of

the NGS, taking into consideration the diversity between the different governments; and to develop an effective monitoring and reporting format incorporating emissions projections and emissions performance as well as the effectiveness and implementation of the NGS proposed measures.

Covering all aspects pertinent to greenhouse gas emissions (i.e. transport and urban planning, land management and sinks, industrial processes and waste management and sustainable energy use) it is the NGS Module 4, the efficient and sustainable energy use and supply component, that provides the focus for renewables. Module 4 outlines three main actions:

- reducing the greenhouse intensity of energy supply;
- harnessing renewable energy; and,
- improving end-use energy efficiency (Commonwealth of Australia, 1998, 41).

The NGS changes were just the beginning for the Howard Government. The biggest changes in policy were yet to come. In 1997, Prime Minister Howard laid out the Government's principles regarding climate change. While still adhering to the countries UNFCCC commitment to reduce greenhouse gas emissions, foremost in the Government's priorities was the promotion of Australia's national interests. This translated into:

- protecting Australian jobs and industry and their international competitive advantage;
- not accepting an unfair share of the greenhouse gas emissions burden;
- rejection of mandatory uniform targets; and
- insistence on the participation of developing countries in dealing with global warming (Commonwealth, 20 November 1997, Hon. John Howard).

> On 20 November 1997, Prime Minister Howard provided policy direction on greenhouse measures, based on the draft NGS, in a document entitled *Safeguarding the Future: Australia's Response to Climate Change* (1997). The measures, outlined in Table 2-5, would purportedly reduce net emissions growth from 28% to 18% for the period 1990 to 2010. The estimates being considered were "realistic, even conservative calculations of emission benefits" (Commonwealth, 20 November 1997, 10923, Hon. John Howard). The Commonwealth Government's proposed measures to address climate change were presented just prior to COP3 held in Kyoto, Japan. It was at COP3, when Australia became a signatory to but refused to ratify the Kyoto Protocol, that the Commonwealth Government

Table 2-5 Measures Announced to Reduce Greenhouse Gases by Prime Minister J. Howard in His Speech Entitled *Safeguarding the Future: Australia's Response to Climate Change*, 1997.

Measure	Intent	Funding
Renewable Energy	To increase the level of renewable forms of energy above the stated 6% of Australia' total energy need	$65 million
	Create a renewable energy innovation investment fund to provide venture capital for high growth potential companies	$21 million
	Loan and grant program for the development and commercialisation of the renewable energy industry	$30 million
	Renewable Energy "Showcase" leading edge technologies	$10 million
	Establish a mandatory target to source an additional 2 per cent of electricity from renewable energy sources by 2010	
Energy Market Reform	Development of energy efficiency standards for fossil fuel electricity generation	
	Emissions reductions standards for existing coal and gas fired plants to be phased in.	
Automotive Industry	Implementation of an automotive industry strategy including mandatory fuel efficiency labelling, noxious emissions standards, a 15 per cent fuel efficiency improvement target, the phasing out of leaded petrol	
	Develop a network of natural gas refuelling stations	
Codes and Standards	Development of energy efficiency codes and standards for housing and commercial buildings, appliances and equipment	
	Implementation of an improved labelling program and minimum energy performance standards for industrial and commercial appliances and equipment	
	Expand the house energy rating scheme to include minimum energy performance requirements for new houses and extensions	
	Develop a voluntary minimum energy performance standard for new and refurbished commercial buildings	
Tree Planting and Revegetation	Remove impediments to commercial plantation development, achieve a plantations vision and treble plantations estates by 2020	
	Establish a bush for greenhouse program	
	Build on the bush care initiative of the Natural Heritage Trust	
Greenhouse Challenge Program	Extend the program to smaller companies and increase the number of participants to more than 1000 companies by 2005	$27 million
Commonwealth Greenhouse Office	Establish a Commonwealth greenhouse office with the responsibility of coordinating domestic climate change policy	
Other Measures	Actions to reduce emissions in urban areas. Initiate best energy practices in targeted industries. Fund an ethanol pilot plant. Develop a carbon accounting system. Fund various national greenhouse strategy related measures. Funding for commercial joint implementation projects in developing countries. Reduce emissions from Commonwealth Government operations, including fuel consumption targets for the Commonwealth vehicle fleet.	

Source: (Commonwealth, 20 November 1997, 10923 - 10925, Hon. John Howard).

negotiated to cap greenhouse gas emissions at 108% of 1990 levels by 2008 to 2012. Australia's specific national circumstances enabled the Commonwealth Government to negotiate a target of eight per cent growth in greenhouse gas emissions over the 1990 baseline:

> a high dependence on fossil fuels for energy production; a high proportion of energy intensive industries, major exports based on energy intensive products; and a high dependence on fossil fuels for transport, exacerbated by a high degree of decentralisation and a preponderance of road over rail transport" (Working Group for Prime Minister's Science Engineering and Innovation Council, 1999, 2).

The 108% Kyoto emission target is discussed in more detail in Chapter 4.

One of the key measures announced by Prime Minister Howard in 1997 was the establishment of the world's first national agency specifically aimed at addressing climate change. The lead Commonwealth Agency on greenhouse matters, the Australian Greenhouse Office (AGO) became responsible for a number of programs including the GHC, the Remote Renewables Power Generation Program (RRPGP), the Greenhouse Gas Abatement Program (GGAP) and the Renewable Energy Commercialisation Program (RECP).

> [The AGO] is responsible for promoting a whole-of-government position on greenhouse issues to the broader domestic and international community. Its integrated, balanced approach facilitates the realisation of both economic and environmental benefits for Australia from the opportunities arising from greenhouse response actions.
>
> The Executive Order establishing the AGO as an Executive Agency specifies that the functions of the AGO are to:
> - provide advice to the Government as the lead Commonwealth agency on greenhouse issues with a whole of government perspective, consulting across portfolios as necessary;
> - administer specific greenhouse programs and assist Ministers in the administration of greenhouse programs in their Portfolios as required;
> - contribute to the development of international greenhouse negotiations; and
> - undertake other tasks related to greenhouse as the Minister may require from time to time (Australian Greenhouse Office, 2003, np).

Another key measure announced by Prime Minister Howard was the establishment of a mandatory target to source an additional two per cent of electricity from renewable energy sources by 2010. Two years later, after consultation with State and Territory Governments, industry and communities, the Commonwealth Government fulfilled this 1997 commitment by proposing the *Renewable Energy (Electricity) Bill 2000.*

> The strategic importance of this legislation is not only that it delivers on a key aspect of our commitment in Kyoto. It is not only that it achieves significant greenhouse gas reductions, of up to seven million tonnes per year. It is also that it represents a big step along the road of 'greening' our electricity generation sector—a sector which represents the single largest contributor to Australia's total greenhouse emissions (Commonwealth, 22 June 2000, 18030, Hon. Dr. Sharman Stone).

The *Renewable Energy (Electricity) Act 2000* was finally passed into legislation in 2001 initiating the Commonwealth's first and, to date, only mandatory commitment towards greenhouse gas reduction. The Act, and the debate surrounding it, is discussed in more detail in Chapters 3 and 4.

Supporting the "whole of government" approach and to improve leadership, cooperation and understanding between the Commonwealth, States and Territories regarding energy in Australia, the Ministerial Council on Energy (MCE) was founded in 2001. Given the responsibility of undertaking continued development of a national energy policy the MCE's emphasis was placed on "the importance of the energy sector to our standard of living through its contribution to responsible and sustainable industry development, international competitiveness and economic growth" (Department of Industry Tourism and Resources, 2004, np).

Also in consultation with business and State and Territory Government's, the Commonwealth initiated a process of dialogue in August 2002 to develop a strategy on climate change. Known as the Forward Strategy on Climate Change, the aim of the process was to achieve greenhouse gas emission abatements and was underpinned by four elements:

- Australia will strive for a more comprehensive global response to climate change;

- Australia will position itself to maintain a strong and internationally competitive economy with a lower greenhouse signature;
- domestic policy settings will balance flexibility with sufficient certainty to allow key decisions on investment and technology development, and also emphasise cost effectiveness; and
- Australia will implement policies and programs that assist adaptation to the consequences of the climate change that is already unavoidable (Kemp, 2002, np).

Five business working groups were formed to examine areas of energy and resources, energy-intensive manufacturing, transport and infrastructure, agriculture and land management, and cross-sectoral issues. Information pertaining to the progress of the working groups was not available at the time of writing.

The Commonwealth Government's position on the Kyoto Protocol is similarly held by the USA and in February 2002, both Government's signed a Climate Action Partnership (CAP). With the stated focus being on practical approaches of dealing with climate change, Minister for the Environment and Heritage Hon. D. Kemp made it clear that the Governments of Australia and the USA were pursuing similar policies regarding climate change. Working Groups were established to:

> focus on such issues as emissions measurement and accounting, climate change science, stationary energy technologies, engagement with business to create economically efficient climate change solutions, agriculture and land management and collaboration with developing countries to build capacity to deal with climate change (Australian Government, 2002, np).

Industry and international businesses, in particular, were expected to benefit from the partnership, specifically the establishment of unified emissions accounting mechanisms between the two countries (Australian Government, 2002, np). Six major activities were established for 2002-2003:

- climate change science and monitoring;
- stationary energy technologies;
- engaging with business - technology development;
- engaging with business - policies, tools and approaches;
- collaboration with developing countries to build capacity to address climate change; and

- greenhouse accounting in the forestry and agriculture sector.

Renewable energy was addressed under stationary energy technologies with attention being given to renewable energy supplies as alternatives to diesel-generated electricity (remote area power supply). The current status of the CAP initiatives is not currently available.

In January 2003, an interdepartmental Energy Taskforce Secretariat was established, "charged with developing a comprehensive and coordinated national energy policy" (Department of Prime Minister and Cabinet, 2003, np). In addition, a number of permanent committees were established to advise the Minister on energy policy including:

- Emerging and Renewable Energy Industry Leadership Group (EREILG);
- the Renewable Energy Action Agenda CEO Group; and
- the COAG Energy Market Review Expert Panel.

Strategic greenhouse policy matters are considered by the Sustainable Environment Committee of Cabinet chaired by the Prime Minister.

In support of national and international politics Australia has continued to work on the science of climate change. In order to establish "the facts from the fiction" regarding climate change, a book entitled *Climate Change: An Australian Guide to the Science and Potential Impacts (2003)* was published based on the IPCC's Third Assessment Report on climate change. Updated to include the latest national and international scientific information the guide indicates that "[s]ome impacts of climate change are now inevitable" (Commonwealth of Australia, 2003, 1). Presenting possible scenarios for Australia regarding water supply and hydrology, ecosystems and conservation, agriculture and forestry, fisheries, industry, settlements and human health, the guide made it clear that "[p]rojected warmings in the 21st century are dependent on scenarios of future emissions of greenhouse gas and aerosols" (Commonwealth of Australia, 2003, 2). Based on the IPCC's *Special Report on Emissions Scenarios* and nine climate models the following was reported:

> [A]verage annual temperatures in Australia are projected to increase by 0.4° to 2°C by 2030, and 1.0° to 6.0°C by 2070, relative to 1990. There would be associated increases in potential evaporation and heatwaves, and fewer frosts. Warming is expected to be greater inland than near the coast. Projections for changes in annual rainfall suggest changes in the south west lie in the range of -20% to +5% by 2030, and -60% to +10% by 2070, with changes of -10% to +5% by 2030 and -35% to +10% by 2070 in parts of south eastern Australia" (Commonwealth of Australia, 2003, 4).

The report identifies that there are significant knowledge gaps making policy making difficult and potentially ineffective with regards to "avoiding significant damages to the economy, ecology and people" (Commonwealth of Australia, 2003, 185). However, evidence is presented which indicates with relative certainty that "the early stages of greenhouse related changes are already occurring justify[ing] prudent risk management through initiation of appropriate mitigation and adaptation strategies" (Commonwealth of Australia, 2003, 179).

2.4. Summary

This chapter aimed to provide a high level, descriptive, chronological overview of international and Commonwealth processes surrounding sustainable development and climate change. Fulfilling the first objective of this study, events from the 1970s to the present are traced to identify increasing international and national efforts to address the interlinked environmental imperatives of sustainable development and climate change. It is these two imperatives that have instigated development in renewable energy alternatives to electricity supply, and it is within the framework of international and national initiatives that Australia has implemented its sole mandatory response to climate change in the form of the *Renewable Energy (Electricity) Act 2000.* Chapter 3 expands in more detail on renewable energy developments in fossil fuel dominated Australia.

3. Renewable Energy Initiatives in Australia

3.1. Introduction

International and Commonwealth initiatives regarding climate change and sustainable development have encouraged and renewed interest in the development of renewable energy for electricity supply in Australia. Renewable energy, particularly in the form of hydro power, has been part of the Australian energy mix for many decades, and approximately 10 per cent of electricity supply has been provided by hydropower. Australia, in fact, held a world leading position in renewable energy development until the mid 1980's (Watt, 2004). However, the campaign for sustainable development amid growing concerns regarding climate change, as well as Australia's international commitment to cap carbon dioxide emissions at 108 per cent of 1990 levels, has facilitated additional renewable energy developments in the form of wind, solar, tidal, biomass, geothermal and ocean thermal power.

The aims of this chapter are twofold and relate to fulfilling research objective two. First, as primary energy use in Australia has historically been dominated by fossil fuels it is necessary to briefly discuss the extent of the fossil fuel domination within the Australian economy in order to place renewable energy developments into context. Second, Commonwealth Government initiatives to advance renewable energy developments in Australia for the purposes of greenhouse gas abatement are identified and discussed.

3.2. Australia's Energy Mix

Australia, as a developed country with a standard of living ranked amongst the top five in the world, has achieved its development status through a dependency on coal. As the fourth largest producer of coal in the world, Australia has over 76 billion tonnes of identified black coal reserves that will last over 200 years at current rates of production (Australian Coal Association, 2003).

According to the Australian Bureau of Statistics, in 2000-01, 15,237 Peta Joules (PJ) of primary energy (i.e. "forms of energy obtained directly from nature, including non-renewable fuels such as coal, natural gas and crude oil, and renewable fuels such as wood, hydro-electricity and solar energy" (Australian Bureau of Statistics, 2003, np)) were produced in Australia. Table 3-1 shows the change in primary energy mix from 1990-91 to 2000-01 and highlights the dominance of black coal which, together with brown coal, accounts for 50 per cent of total energy production. Included in these amounts is primary energy for export purposes. Renewable energies accounted for 267 PJ, or 1.8 per cent of total production within the same time frame.

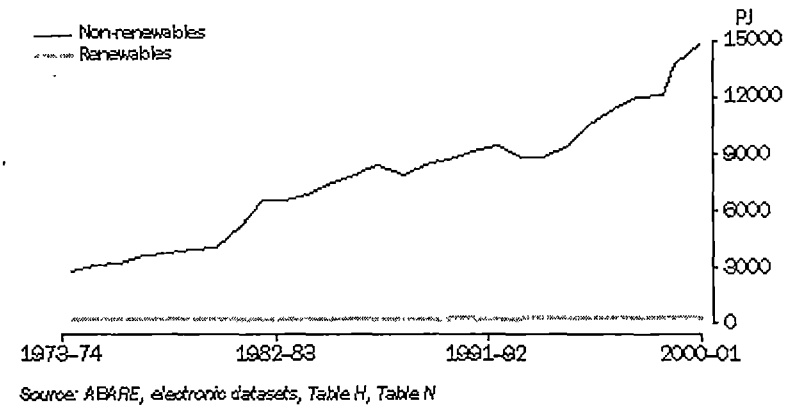
Table 3-1 Australia's Production of Primary Energy

	1990-91	2000-01	Change from 1990-91 to 2000-01
Fuel	**PJ**	**PJ**	**%**
Black coal	4,396.0	6,859.7	56.0
Brown coal	484.1	664.7	37.3
Crude oil and LNG	1,182.3	1,432.1	21.1
LPG	94.0	107.5	14.4
Natural gas	840.4	1,405.9	67.3
Uranium	2,062.8	4,500.4	118.2
Wood	100.1	108.4	8.3
Bagasse	78.2	93.8	19.9
Hydro-electricity	58.0	60.4	4.1
Solar	2.4	4.4	83.3
Total	9,298.3	15,237.3	63.9

Source: (Australian Bureau of Statistics, 2003, np).

Figure 3-1 presents the Australian production of primary energy fuels, distinguishing between non-renewable and renewable energy sources from 1973 to 2001. Showing an increasing trend in the production of non-renewable fuels, the results indicate little growth in the production of renewable energy. Between 1973-74 and 2000-01 renewable energy production increased slightly from 197 PJ to 267 PJ respectively. However, within the same time frame the total percentage of renewable energy production reduced from approximately seven per cent to less than two per cent (Australian Bureau of Statistics, 2003, np).

Figure 3-1 Production of Primary Fuels distinguishing between Renewable and Non Renewable Energy Sources



Source: (Australian Bureau of Statistics, 2003, np).

Australia is also the world's largest coal exporter supplying over 35 countries. In 2001-02, black coal made up 51 per cent of total energy exports (see Table 3-2) and between 1993-94 and 2001-02 exports in black coal increased by 53 per cent (Australian Bureau of Statistics, 2003, np). Second to coal is the export of uranium (Table 3-2)

Table 3-2 Australia's Primary Energy Products and Volume of Exports

Primary Energy Products	Volume of Exports	
	1993-94	2001-02
Type of Fuel	PJ	PJ
Black coal	3,484.5	5,339.5
Crude oil and ORF	352.9	892.1
LPG	38.7	94.8
Natural gas	327.8	435.9
Uranium	1,877.2	3,462.0
Total	6,081.1	10,224.3

(Australian Bureau of Statistics, 2003, np)

which from the perspective of greenhouse gas emissions is a benefit. However, the debate surrounding the use of nuclear fuel for energy supply is beyond the scope of this thesis.

The total export of energy products "contributed about 21% towards Australia's total export earnings in 2001-02 [$25 503 million], up from 18% [$11 309 million] in 1993-

94. Black coal accounted for by far the largest share of the total value of energy exports (52.2%) or $13 323 million in 2001-02" (Australian Bureau of Statistics, 2003, np).

The NGS identifies that "Australia's reliance on coal (at over 40% of the energy mix) is double that of the OECD average" (Commonwealth of Australia, 1998, np) with the majority of manufacturing industries being highly energy-intensive. So integral is the production, use and export of coal in the Australian economy that it is also the "largest single source, 57%, of Australia's greenhouse gas emissions" (Commonwealth of Australia, 1998, 1) and, according to available statistics, the emissions are increasing:

> ...fossil fuel combustion is the major contributor to Australia's greenhouse gas emissions. [Table 3-3] shows that the electricity supply industry accounts for nearly half of total energy-related emissions, and that emissions in this industry grew by 25% between 1992-93 and 1997-98. Direct emissions by households contributed around 13% in 1997-98, with most of these emissions due to motor vehicle use. Other significant direct emitters of greenhouse gases included manufacturing of iron and steel; mining; manufacturing of basic non-ferrous metals and products; air and space transport; and road transport (excluding household motor vehicle use). Combined emissions from this group of industries accounted for nearly 20% of energy-related emissions in 1997-98 (Australian Bureau of Statistics, 2003, np).

The above information is specific to energy used in Australia, excluding exports. It is important to note that energy used and not energy produced are the figures used to calculate greenhouse gas emissions. With emissions projected to grow substantially "by around 28% from 1990 to 2010" (Commonwealth of Australia, 1998, 1), the need to initiate abatement actions becomes clear, and especially so when there is recognition of the need for deep cuts of 50-60 per cent this century (Kemp, 2002a, np).

3.3. The Launch of Renewable Energy Initiatives in Australia

In 1997, immediately prior to COP 3 held in Kyoto, Japan, the Commonwealth Government proposed the abatement actions it was prepared to undertake. Prime Minister Howard delivered a landmark address entitled *Safeguarding the Future: Australia's Response to Climate Change*. In this address the measures that Australia was

Table 3-3 Production of Australian Energy-Related Greenhouse Gases (a), by Industry

Industry	1992-93 Gg CO_2-e(b)	1993-94 Gg CO_2-e(b)	1994-95 Gg CO_2-e(b)	1995-96 Gg CO_2-e(b)	1996-97 Gg CO_2-e(b)	1997-98 Gg CO_2-e(b)	Change 1992-93 to 1997-98 %
Agriculture; hunting and trapping; forestry and fishing	6,053	6,252	6,518	6,737	6,988	7,188	18.8
Mining	10,986	11,237	12,295	13,271	14,596	15,136	37.8
Manufacturing	52,431	52,934	55,665	56,603	55,437	57,166	9.0
Electricity and gas	135,987	137,164	142,412	148,256	153,611	169,562	24.7
Construction	4,293	4,419	4,582	4,809	4,819	4,958	15.5
Transport	25,443	26,332	29,111	30,708	31,415	30,939	21.6
Services	7,781	7,997	8,325	8,610	8,823	9,063	16.5
Household production	42,194	42,990	44,051	44,361	45,286	45,587	8.0
Total	**285,168**	**289,325**	**302,959**	**313,355**	**320,975**	**339,597**	**19.1**

(a) Excludes fugitive emissions.
(b) Gigagrams of carbon dioxide equivalents (CO_2-e).
Note: Due to varying classification systems, definitional differences, and various states of revision of data sources, figures will not necessarily reconcile with other data sources. Statistics of greenhouse gas emissions are also available for 1999 from AGO 2000.
Source: Energy and Greenhouse Gas Emissions Accounts, Australia, 1992-93 to 1997-98 (4604.0).
(Australian Bureau of Statistics, 2003, np)

to take to address climate change were identified. One of these measures effectively launched the second "renewable energy age" in Australia.

The measures outlined addressed renewable energy, energy market reform, the automotive industry, codes and standards, tree planting and revegetation, the Greenhouse Challenge program, the establishment of a Commonwealth Greenhouse Office and other measures (Table 2-5). Prime Minister Howard stated:

> The package I announce today will achieve a dramatic reduction of a third in our expected net emissions growth from 1990 to 2010. These measures will reduce our net emissions growth from 28 to 18 per cent in that period, or some 39 million tonnes of emissions. This is comparable to the emissions from all the electricity used by households right across Australia (Commonwealth, 20 November 1997, 10923, Hon. John Howard).

The suite of initiatives specific to renewable energy was as follows:

- a commitment of $65 million to increase renewable forms of energy from the then existing six per cent of Australia's energy needs;

- creation of a "specialist renewable energy innovation investment fund to provide government and private sector venture capital for companies with high growth potential" (Commonwealth, 20 November 1997, 10923, Hon. John Howard);
- a $30 million loan and grant program for the development and commercialisation of the renewable energy industry, supporting the "creation of new businesses, jobs and exports" (Commonwealth, 20 November 1997, 10924, Hon. John Howard);
- $10 million for "showcase" projects – tidal power, solar thermal power, and photovoltaic technologies; and
- mandatory targets for electricity retailers to source an additional two per cent of electricity from renewables.

Prime Minister Howard concluded his briefing on renewable energies with the following statement:

> Our new programs will stimulate innovative technologies and wealth creating businesses and energy suppliers who provide power to communities, employ Australians and export to the world. It is, in every sense of the word, an action oriented approach (Commonwealth, 20 November 1997, 10924, Hon. John Howard).

Amongst the proliferation of strategies, funding opportunities, best practice initiatives, development of codes and standards, government/industry partnerships, and the establishment of a government-coordinating agency, one measure would become mandatory. This measure was to be known as the Mandatory Renewable Energy Target (MRET) as legislated in the *Renewable Energy (Electricity) Act 2000.*

In June 2000, twenty seven months after it was first announced as one of the "*Safeguarding the Future*" measures, the Howard Government brought before the House of Representatives the *Renewable Energy (Electricity) Bill 2000* which was introduced as:

> [t]he primary legislation to implement the government's mandatory renewable energy target. This legislation brings into force one of Australia's most strategic greenhouse response measures - a legal requirement for large buyers of electricity to source more of their electricity needs from environmentally friendly, renewable fuel sources (Commonwealth, 22 June 2000, 18030, Hon. Dr. Sharman Stone).

Mandating a target of two per cent, or a fixed 9500 Gigawatt hours (GWh), of electricity to be generated from renewable energy sources by 2010, the objectives of the Bill were ostensibly to:

- increase renewable energy generation in Australia;
- reduce greenhouse gas emissions;
- provide an ongoing base for commercially competitive renewable energy; and
- contribute to the development of internationally competitive industries, which could participate effectively in the burgeoning Asian energy market.

The Bill established broad principles relating to eligibility of renewable energy sources and generators, outlined liability requirements and penalties for non-compliance, and created a new currency - tradeable renewable energy certificates (RECs) - that could be generated from eligible sources of renewable energy. One Megawatt hour (MWh) of renewable electricity delivered to the grid became worth one REC.

In 2001, after significant debate and considerable support from the fledgling renewable energy industry, the mandatory renewable energy target, or MRET as it became known, was implemented through the *Renewable Energy (Electricity) Act 2000*, the *Renewable Energy (Electricity) (Charge) Act 2000* and the *Renewable Energy (Electricity) Regulations.* The Office of the Renewable Energy Regulator (ORER) was established to administer the legislation. Meanwhile, other activities were taking place in tandem, notably the development of the Renewable Energy Action Agenda.

The Renewable Energy Action Agenda (REAA) was established in 2000 as a result of a collaborative initiative between the Commonwealth Government and industry. A group of Chief Executive Officers from a number of renewable energy industry associations, the AGO and the Department of Industry, Tourism and Resources (DITR) developed the REAA with the aim of "strategically analysing industry's competitive position, identify opportunities and impediments to growth, and to develop a set of actions to achieve a sustainable and internationally competitive Australian renewable energy industry by 2010" (Australian Business Council for Sustainable Development, 2003, 2). Five strategies for renewable energy emerged from the REAA, supporting its vision of

achieving "an internationally competitive renewable energy industry by 2010, with annual sales of $4 billion" (Australian Business Council for Sustainable Development, 2003, 6), being to:

- develop and grow the market for renewable energy products;
- increase community commitment to renewable energy;
- build industry capability;
- establish the policy framework for the development of the industry; and
- develop a renewable energy industry culture of innovation.

A number of existing and new renewable energy specific initiatives also require mention. The Business Council for Sustainable Energy (BCSE) was established as a result of a merger between organisations representing different renewables businesses: Eco Generation and the Sustainable Energy Industry Association (SEIA) (Watt, 2004), thereby creating a renewables industry council. The Bushlight project was established, as a sub project of the RRPGP, to provide renewable electricity to indigenous communities in the Northern Territory, Western Australia, Queensland and South Australia. A Renewable Energy Technology Roadmap was developed to focus on technology development and innovation and outlined a long-term research and development plan (Kemp, 2003). The Renewable Energy Export Network (REEN) was formed to assist renewable energy companies develop export markets. A capability review was undertaken to determine commercial prospects for the renewable energy industry, renewable energy standards were developed and a curricula for energy education and training was developed.

In June 2001, the Council of Australian Governments (COAG) established a National Energy Policy Framework "to guide future energy policy decision-making by jurisdictions and to provide increased policy certainty for energy users" (COAG, 2001, np). One of the agreed national energy policy objectives was "[m]itigating local and global environmental impacts, notably greenhouse impacts, of energy production, transformation, supply and use" (COAG, 2001, np). To support this objective, COAG agreed in principle to "encourage the efficient economic development and increased application of less carbon-intensive (including renewable) energy sources and

technologies, including exploring opportunities for appropriate inter-fuel substitution" (COAG, 2001, np). While recognising the opportunity provided by renewable energy alternatives COAG also made it quite clear that:

> ... this resource availability and technological capacity is not sufficient, in itself, to guarantee future secure, reliable and competitively priced provision of energy services to business and the community. Australia can be expected to remain substantially reliant on its fossil fuel supplies for energy needs for the foreseeable future (COAG, 2001, np).

As part of the framework COAG also agreed to establish a MCE with one of its first actions being to undertake an independent energy market review. The Review, undertaken to form the basis of the Commonwealth's national energy policy, was commissioned in 2001. Chaired by the Hon. Warwick Parer, the Energy Market Review's report entitled *Towards a Truly National and Efficient Energy Market* was released in late 2002. The Parer Review, as it came to be known, identified a number of issues pertaining to greenhouse gas emissions. These were as follows:

- The major greenhouse measures are poorly targeted, and they seek to pick technology 'winners'.
- A wide variety of new technologies are under active consideration.
- The Commonwealth and the States have each introduced schemes that create gaming and distortion.
- The energy industry faces large costs because of the greenhouse uncertainty (Commonwealth of Australia, 2002, 25).

The proposed solutions to the greenhouse issues were.

- Introduce emissions trading within three years.
- Announce the immediate cessation of the poorly targeted schemes (e.g. MRET, GEC, benchmarking).
- Exempt the traded good sector from the effects of the emissions trading scheme until Australia is part of a worldwide greenhouse scheme (Commonwealth of Australia, 2002, 25).

These recommendations had potentially significant implications for the renewable energy industry if adopted. The implications of the Parer Review on MRET are further discussed in Chapter 4.

In June 2002, amendments to the *Renewable Energy Electricity Act 2000* were proposed and the *Renewable Energy (Electricity) Amendment Bill 2002* was submitted to Parliament. The intention of the Bill was to "clarify key definitions in the original

legislation and to provide for greater efficiency and effectiveness in the administration of the legislation" (Commonwealth, 27 June 2002, 4548, Hon. David Kemp). The amendments included a clarification of definitions, and the provision of more decision making, legislative and information gathering powers to ORER. To date the proposed amendments are still to be finalised in Parliament.

Section 162 of the *Renewable Energy (Electricity) Act 2000* required an independent review to be undertaken of the operation of the Act, as soon as practicable after two years from its commencement. In March 2003, Minister for the Environment and Heritage Hon. D. Kemp and Minister for Industry, Tourism and Resources Hon I. MacFarlane commissioned a high level Panel to review the Commonwealth's MRET legislation. The review had to determine the extent that MRET had been fulfilling its original objectives in terms of reducing greenhouse gas emissions, encouraging renewable energy generation, developing a competitive renewable energy industry and facilitating beneficial social and economic impacts. The review also examined key issues that raised significant debate at the time the legislation was first mooted, namely the level of the MRET. This will be discussed in more detail in Chapter 4.

The review entitled *Renewable Opportunities. A Review of the Operation of the Renewable Energy (Electricity) Act 2000,* (henceforth called the MRET Review 2003) was submitted to the Commonwealth Government in September 2003 and subsequently released to the public in January 2004. The review determined, inter alia, the following:

- By August 2003, MRET had contributed significantly to additional renewable energy generation with 190 power stations accredited (Commonwealth of Australia, 2003b, xvi).
- To date, growth in renewable energy generation has come primarily from the hydro and solar hot water sectors, with strong growth in the wind sector coming from a small base. Generation from biomass, including bagasse, has not been as significant as expected prior to the introduction of MRET. The measure has only had a marginal influence on generation from solar voltaics, and no RECs have been created from wood waste sourced from native forests (Commonwealth of Australia, 2003b, xvi).
- To date, MRET has made only a small contribution to greenhouse gas abatement, although this is expected to increase as interim targets rise towards 9500 GWh. By the time the Kyoto compliance period of 2008 to 2012 is reached, MRET can be expected to have contributed around

6.5 million tonnes (Mt) of carbon dioxide equivalent (CO_2-e) abatement per annum, or around 10 per cent of total current projected abatement (Commonwealth of Australia, 2003b, xvii).

- MRET has contributed to employment growth in the renewable energy industry, especially in regional Australia where many renewable resources are located (Commonwealth of Australia, 2003b, xviii).
- Renewable energy generally, and MRET in particular, has broad community support, with survey evidence showing that many residential consumers are willing to pay more of electricity generated from renewable sources (Commonwealth of Australia, 2003b, xviii).

The MRET Review 2003 made it clear that MRET is not a "least cost" abatement measure, however, anticipating that international and national greenhouse gas abatement targets may increase in extent and cost, "renewable energy may become a more cost effective means of abatement" (Commonwealth of Australia, 2003b, xix). Most importantly, the MRET Review 2003 recommended that the 9500 GWh target be maintained until 2012 and increased to 20 000 GWh by 2020. This would provide "ongoing certainty and industry development opportunities to the renewables industry" (Commonwealth of Australia, 2003b, xxi).

The Howard Government has yet to release its response to the review findings but it is envisaged that the Government will incorporate its response within the context of the National Energy Policy and the development of Australia's Forward Strategy on Climate Change.

3.4. Summary

Within the broad framework of fossil fuel dominated, primary energy production in Australia, since 2001, renewable energy initiatives have been established as a result of the *Renewable Energy (Electricity) Act 2000* and its mandatory renewable energy target. Implementing the Act has become the Commonwealth Government's sole mandatory and primary greenhouse response mechanism. In addition, a proliferation of committees, strategies, funding opportunities, best practice initiatives, government/industry partnerships and development programs supported Australia's greenhouse gas abatement activities.

The aims of this Chapter were twofold: first, to briefly discuss the extent of the fossil fuel domination within the Australian economy in order to place renewable energy developments into context, and second, to identify renewable energy initiatives undertaken by the Commonwealth. This fulfils research objective two of the thesis. Now it becomes possible, in Chapter 4, to examine more closely the key issues and debates that have significantly influenced renewable energy developments in Australia.

4. Key Issues Influencing Renewable Energy Policy in Australia

4.1. Introduction

People and organisations, politics and vested interests have had considerable influence on events to date. The *Renewable Energy (Electricity) Act 2000* and related Regulations, associated funding, research and development and other measures regarding renewable energy developments were established as key measures to address Australia's greenhouse gas emissions and climate change. However, as with most innovations that challenge the status quo and require governments political will and financial support to establish the necessary skill, infrastructure and industrial advancement, the path and progress of renewable energy developments in Australia has been challenging.

The aim of this chapter is to fulfil research objective three and analyse in greater depth the complexities of debate and key issues associated with Australia's renewable energy policy developments. As a unique contribution to research in renewable energy policy, specific focus has been placed on the analysis of Parliamentary debate in the Commonwealth arena. Combined with information gathered from reports and literature, evidence is gathered from which a synthesis of issues impacting on renewable energy policy is made. The issues influencing the debate on renewable energy policy are many and varied. They range from:

- Australia's position as the world's largest per capita greenhouse gas emitter;
- Australia's international climate change commitments;
- the implications on renewable energy developments of not ratifying the Kyoto Protocol;
- Australia's relationship with the USA;
- the introduction of the mandatory renewable energy target; and
- budgetary commitments.

These issues will now be discussed.

4.2.1 A Relatively Small Emitter

The legal requirement for electricity suppliers to source 9500 GWh of their generated electricity from renewable energy sources was introduced as the Commonwealth Government's primary mandatory "strategic greenhouse response measure" (Commonwealth, 22 June 2000, 18030, Hon. Dr. Sharman Stone). It is, therefore, important to know Australia's status as a greenhouse gas emitter within the context of global emissions.

According to data available from the UNFCCC (UNFCCC, 2002, np), CO_2 emissions from Annex 1 Parties decreased from a total of 17,956,331 Gigagrams (Gg) in 1990 to 15,332,596 Gg in 2000 (Table 4-1). In 1990, the USA was the highest emitter of the developed countries with 4,998,516 Gg of CO_2 emitted, followed by the European Community, the Russian Federation, Japan, Germany, Ukraine, the United Kingdom, Poland, Canada, Italy, France and Australia in twelfth place. By 2000, although the USA remained the largest greenhouse gas producer, Australia had risen to the ninth highest global emitter. In ten years Australia's CO_2 emissions increased from 277,867 Gg in 1990 to 347,006 Gg in 2000. During the same time period only Portugal, Ireland and Spain had greater emission increases, all of which started from a much lower base level.

Despite being one of the highest emitters in the world, the Commonwealth Government has maintained that within a global perspective, Australia has been responsible for only 1.4 per cent of total CO_2 emissions. As such, Australia is a relatively small emitter on a world scale that will have "very little effect upon the global outcome" (Commonwealth, 23 September 1997a, 6710, Senator Hon. Robert Hill). As a result of this perspective, one of the key issues that the Commonwealth Government rejected in international negotiations was the UN's mandatory uniform greenhouse gas target. The Commonwealth Government considered any uniform target would be a disadvantage to Australia by placing upon the country an unfair share of the overall burden of decreasing greenhouse emissions.

Table 4-1 National Total of CO_2 Emissions for Annex 1 Parties for 1990 and 2000

Annex 1 Parties National Total of CO_2 (in Gigagrams) for 1990 and 2000			Per cent change in National Total of CO_2 (in Gigagrams) between 1990 and 2000
Country	**1990**	**2000**	
Australia	277,867	347,006	24.88
Austria	62,297	66,102	6.11
Belarus			
Belgium	117,966	127,040	7.69
Bulgaria	103,856		
Canada	471,563	571,427	21.18
Croatia	23,305		
Czech Republic	163,990	127,902	-22.01
Denmark	52,635	52,852	0.41
Estonia	38,107	16,849	-55.79
European Community	3,341,804	3,324,800	-0.51
Finland	62,466	62,305	-0.26
France	394,067	401,923	1.99
Germany	1,014,501	857,908	-15.44
Greece	84,336	103,727	22.99
Hungary	83,676	59,445	-28.96
Iceland	2,065	2,444	18.35
Ireland	31,599	43,925	39.01
Italy	439,478	463,381	5.44
Japan	1,119,319	1,237,107	10.52
Latvia	23,527	6,847	-70.90
Liechtenstein	195		
Lithuania	39,535		
Luxembourg	12,750	5,399	-57.65
Monaco	98		
Netherlands	159,630	173,527	8.71
New Zealand	25,267	30,852	22.10
Norway	35,163	41,273	17.38
Poland	476,625	314,812	-33.95
Portugal	44,109	63,150	43.17
Romania	194,826		
Russian Federation	2,372,300		
Slovakia	59,746	41,472	-30.59
Slovenia	13,935		
Spain	227,233	306,632	34.94
Sweden	56,065	55,855	-0.37
Switzerland	44,420	43,853	-1.28
Ukraine	703,792		
United Kingdom	583,705	542,743	-7.02
United States of America	4,998,516	5,840,039	16.84
Total	**17,956,331**	**15,332,596**	

Source: (UNFCCC, 2002).

The Commonwealth Government has also had strong opinions regarding the non-participation of developing countries in greenhouse gas reduction activities. Data available for some developing countries (Non Annex Parties) for 1990 indicates CO_2 emissions are around 1,542,969 Gg or approximately nine per cent of developed countries (Table 4-2). Information is not available for the developing countries for 2000. Based on the expectation that developing countries "within a few years [will] be producing more greenhouse gases than are currently produced by the developed world" (Commonwealth, 23 September 1997a, 6714, Senator Hon. Robert Hill), the Commonwealth Government proposed that developing countries should participate more fully and equitably in a lasting solution to global warming. This proposal pays no attention to the fact that, in terms of the Kyoto Protocol, developing countries are expected to become involved in the second, post 2012, commitment period.

Before discussing Australia's international negotiating position on climate change which is critical to understanding the significance of the Commonwealth Government's attitude to renewable energy developments, one more statistic is of relevance. IEA data (Unander, 2003, 18) for 1998 shows that Australia was the third largest per capita household CO_2 emitter from fuel and electricity in the world after the USA and Denmark. Figures from The Australia Institute (TAI) are even more revealing and show that:

> Australia has the highest level of per capita greenhouse gas emissions in the industrialised world, with emissions of 27.9 tonnes of CO_2-e per person in 1999. This is over twice the industrialised country average of 12.8 tonnes CO_2-e, 25 per cent higher than the next highest per capita emitter, Canada, and 35 per cent higher than the world's largest polluter, the USA. In comparison, per capita emissions in major industrialised European countries, such as France (8.2 tonnes per capita), Germany (11.6), Italy (9.1) and the UK (10.8) are substantially lower (Turton & Hamilton, 2002, 2).

Recognition of Australia's position as the world's largest greenhouse gas emitter places a responsibility on the Commonwealth Government to undertake credible and significant actions to address the situation. Without such action it is unlikely that Australia will have

Table 4-2 National Total of CO_2 Emissions for Non Annex Parties for 1990

Non Annex Parties* National Total Emissions of CO_2 (in Gigagrams) in 1990	
Antigua and Barbuda	288
Argentina	101,585
Armenia	22,013
Azerbaijan	44,702
Bahamas	1,894
Barbados	1,564
Bolivia	6,507
China	2,429,000+
Colombia	49,707
Costa Rica	2,749
Cuba	35,424
Ecuador	20,028
Egypt	84,459
Ethiopia	2,307
Georgia	35,758
Ghana	3,124
Guatemala	4,245
Guyana	1,198
India	585,185#
Indonesia	142,688
Kazakhstan	230,389
Lao People's Democratic Republic	415
Mexico	308,632
Mongolia	13,650
Niger	598
Paraguay	10,744
Republic of Korea	256,513
Republic of Moldova	28,323
Saint Vincent and the Grenadines	82
Trinidad and Tobago	14,987
Uruguay	3,838
Uzbekistan	114,559
Total	**4,557,154**

*Data not available from the following countries: Algeria, Bhutan, Botswana, Burkina Faso, Burundi, Cape Verde, Chad, Chile, Congo, Cook Islands, Cote D'Ivoire, Democratic Republic of the Congo, Dominica, El Salvador, Grenada, Haiti, Honduras, Israel, Jamaica, Jordan, Kiribati, Lebanon, Lesotho, Malaysia, Maldives, Mali, Mauritius, Micronesia (Federated States of), Morocco, Nauru, Nicaragua, Niue, Panama, Papua New Guinea, Peru, Philippines, Saint Kitts and Nevis, Saint Lucia, Samoa, Senegal, Seychelles, Singapore, Sri Lanka, Swaziland, Thailand, Togo, Tunisia, Turkmenistan, Tuvalu, Vanuatu, Yemen, Zimbabwe. Source: (UNFCCC, 2002),
Source: # (Asian Development Bank, 1998)
Source:+ (Natural Resources Defence Council, 2001)

a credible voice on environmental issues globally and, more specifically, in the Asia Pacific region. The position the Commonwealth Government took in negotiating its international responsibilities is now presented.

4.2.2 Australia's International Negotiating Position on Climate Change

While having firm perspectives on voluntary, non-uniform greenhouse gas targets and participation in greenhouse reduction activities by developing countries, of paramount importance to Australia's international negotiating position on climate change has been the protection of jobs and industry, specifically in the resource sector. In this regard two agencies, the Australian Bureau of Agriculture and Resource Economics (ABARE) and the Department of Foreign Affairs and Trade (DFAT) significantly influenced Australia's negotiating position with regards to Kyoto.

ABARE, a Commonwealth Government economic research agency, had been analysing the implications of ratifying the Kyoto Protocol on Australian industry. It also looked at the effects of climate change actions on developing economies, different emission abatement policies, and the potential implications of these policies on energy consumption and energy exports. In 1997, ABARE released a report that presented a number of critical predictions, of which two are important:

- Global greenhouse gas emissions will continue to increase. Developing country emissions will double and overtake emissions from developed countries by 2010.
- It is not in Australia's national interest to ratify the Kyoto Protocol because petrol and electricity prices will increase, the production and export of mining and manufactured goods will decrease and Australia's industrial competitiveness will be reduced. Jobs will be lost.

The report stated:

> if Australia were to ratify, Australian production and exports of most emission intensive mining and manufactured goods would likely to be much lower in 2015 than they would otherwise have been, as their competitiveness against goods from nonparticipating countries would be

> reduced (Australian Bureau of Agricultural Resource Economics, 2003b, 1)

In support of ABARE, DFAT undertook a survey of the investment that was planned by Australia's energy and emission-intensive sector by State and Territory Governments, industry and business. Entitled *Australia and Climate Change Negotiations* (Department of Foreign Affairs and Trade, 1997) the survey stated that approximately $68 billion of investment in energy intensive projects, with an associated 90 000 permanent full time jobs, could be lost if uniform emission targets were accepted.

The two reports formed the basis for the Commonwealth Government's perspective that economic growth, future prosperity and jobs, specifically in regional Australia, were at the greatest risk of an "unfair outcome in the climate change negotiations" (Commonwealth, 27 May 1997, 4101, Hon. Alexander Downer).

The ABARE and DFAT studies were immediately condemned by opposition parties and economists. For example, ABARE's model – MEGABARE - was strongly criticised for numerous inadequacies. These included the allegation that the "model does not provide accurate or reliable estimates of the economic impacts of emission reduction policies" (Hamilton & Quiggin, 1997, vi). Furthermore Hamilton and Quiggin (1997) argue that "[t]he model fails to allow for *technological change* in response to policies to cut emissions. Technological developments in energy efficiency and renewable energy will clearly have a major impact on the costs of meeting targets" (Hamilton & Quiggin, 1997, v). The model also allegedly "made some extraordinary assumptions, which significantly distorted the results including that 60 per cent of Australia's electricity supply would come from renewable sources by 2020. As desirable as this might be, it is clearly an extremely high-cost scenario that was obviously going to paint a gloomy picture" (MacGuire, 2002, 2).

It is noteworthy that in May 1997, Greens Senator B. Brown asked the Minister for Resources and Energy, Hon. Senator W. Parer which organisations had contributed to the development of ABARE's MEGABARE or GIGABARE models, and how much they had paid towards model development. Senator Parer provided the evidence that $50,000

bought access to the design and documentation of the ABARE model (Table 4-3), including participation from Norway, the USA and large multinational companies. It became evident that the accusations levelled at ABARE, of being "heavily patronised by the coal and oil industries, which stand to loose the most from any proposal advocating a reduction in greenhouse gas emissions" (Commonwealth, 1 December 1997, 11655, Hon. Janice Crosio) had justification. TAI recommended that "in order [for the Government] to avoid suspicion of client capture, the Government's economic analysis should be funded solely from the public purse" (Hamilton & Quiggin, 1997, 6).

The DFAT report was criticised because of the assumptions that it made. DFAT findings were based on a survey of potential resource projects valued at over $100 billion and under consideration to proceed over the following five year period. Of the potential $100 billion, $68 billion worth of projects were considered to be in jeopardy should a uniform emissions target be imposed. The Labor Party pointed out:

Table 4-3 Funding Contributions to the Development of the ABARE Climate Change Models

Activity:	Funding $ *			
	1993-94	1994-95	1996-97	1997-98
Industry				
ACIL Economics & Policy Pty Ltd (for Australian Coal Association)	50,000	50,000		
Australian Aluminium Council			25,000	
Business Council of Australia		60,000	50,000	
CRA Limited			25,000	
BHP Co Ltd			50,000	
Den Norske Stats Olijeselskap (Statoil), NORWAY			50,000	50,000
Electricity Supply Association of Australia			50,000	
Exxon Corporation, USA			50,000	
Mobil Oil Australia Limited			50,000	
Texaco Inc, USA.			50,000	
TOTAL – Industry	**50,000**	**110,000**	**400,000**	**50,000**
Government				
Department of Environment, Sport & Territories		50,000	50,000	
Department of Foreign Affairs & Trade	27,000		50,000	
Department of Industry, Science & Technology		50,000		
Department of Primary Industries & Energy	100,000		50,000	
TOTAL – Government	**127,000**	**100,000**	**150,000**	

*No information was provided for the funding year 1995-96.
Source: (Commonwealth, 28 May 1997, 3934 - 3935, Senator Hon. Warwick Parer).

> If all [the $68 billion worth of projects] went ahead they would increase employment by 90,000. The claim that up to 90,000 jobs could be lost by accepting uniform emission targets is based on the assumption that none of these projects would then proceed. But, as DFAT itself admitted in its paper 'Australia and climate change negotiations', if business continued as usual: *It is unclear how many of these projects would actually proceed to the construction stage*. The claim of 90,000 jobs lost assumes that they would all have gone ahead under business as usual but that none would go ahead if emission targets were applying. Both these assumptions are extreme (Commonwealth, 17 November 1997b, 10498, Hon. Ralph Willis).

Despite these shortcomings, with ABARE and DFAT findings in mind, as well as Australia's specific national circumstances as a major fossil fuel exporter, energy producer and user, the Commonwealth Government took a "different position to the majority of other developed countries" (Kay, 1998, 2) at COP 3 in 1997. Kay reports that Australia went to Kyoto with a negotiating position "for an 18 per cent increase in emissions of all greenhouse gases between 1990 and 2010" (Kay, 1998, 4).

At Kyoto the Commonwealth Government secured a number of key negotiated outcomes. Australia successfully negotiated for differentiated "individual targets dependent upon what countries were willing to agree to" (Kay, 1998, 4) therefore facilitating a range of targets as identified in Table 2-3. In addition, Australia secured what has become known as the "Australia Clause" (The Australia Institute, 1998, 7), Clause 7 of Article 3 of the Kyoto Protocol.

> Those Parties included in Annex I for whom land-use change and forestry constituted a net source of greenhouse gas emissions in 1990 shall include in their 1990 emissions base year or period the aggregate anthropogenic carbon dioxide equivalent emissions by sources minus removals by sinks in 1990 from land-use change for the purposes of calculating their assigned amount (United Nations, 1997, 4).

By including emissions from land clearing, estimated to be 116 million tonnes (Mt), in the setting of its 1990 base year emissions standard, Australia secured an increase in allowable emissions from a 380 Mt of carbon dioxide equivalent to 496 Mt. By negotiating an additional eight per cent over the 496 Mt 1990 base year, Australia's Kyoto target was set at an average of 536 Mt a year for the period 2008-2012 (The

Australia Institute, 1998). TAI argued that greenhouse gas inventory records showed emissions from land clearing had already started falling from 166 Mt in 1990 to 78 Mt in 1995. This fact the Government negotiators would have been aware of when they secured an additional increase of 116 Mt of allowable emissions.

Nevertheless the Commonwealth Government negotiators had achieved "an outstanding success in Kyoto on behalf of Australia" (Commonwealth, 11 March 1998, 992, Hon. Alexander Downer) of a 108 per cent target. This target represented:

> ... an estimated 30 per cent decrease in business as usual emissions by 2008 to 2012. Emissions from the energy sector alone are expected to grow by 40 per cent by 2010 under a business as usual scenario ... The achievement of Australia's Kyoto target will be a significant challenge, requiring the full implementation of existing and planned greenhouse mitigation measures (Kay, 1998, 6).

The Commonwealth Government was strongly criticised.

> Amending the Kyoto protocol to provide greenhouse offsets for reduced land clearing in Australia was admittedly a master stroke but an extremely cynical one.
>
> As Australia moves away from broad land farming, the era of massive land clearing is at an end and would have been, Kyoto or no Kyoto. So we claim credit for a course of conduct that will not change and costs absolutely nothing—the ultimate cheap gesture. Taking land clearing credits into account means that in practice our capacity to increase greenhouse gas emissions may rise by 25 or 30 per cent by 2008 to 2012—not just the eight per cent allowed for in the treaty. Our aim seems to be to become the world's gold medal polluters per capita, and we are right on target (Commonwealth, 2 June 1998, 4497 - 4498, Barry Jones).

With the 108 per cent target achieved and the pressure removed the Labor Party stated that: "Australian industry breathed a collective sigh of relief. It was to be business as usual. No need to rethink resource use, plan for energy efficiency, invest in new plant or create new industries" (Commonwealth, 2 June 1998, 4498, Barry Jones). It was considered by opposition groups that Australia left Kyoto with a permit to continue emitting greenhouse gases and the long term implications are considerable (The Australia Institute, 1998). Not only had Australia forfeited credibility regarding environmental issues, it had also forfeited the opportunity to advance technologically with the rest of the world. For the development of renewable energy alternatives, exclusion from

international climate change processes was not considered to be an optimum solution. This issue will now be discussed.

4.2.3 The Potential Implications on Renewable Energy Developments of Not Ratifying the Kyoto Protocol

Australia's negotiating position regarding the Kyoto Protocol and its 108 per cent emissions target has been addressed in Sections 2.3 and 4.2.2. The Howard Government's response to the Protocol has been based on what is termed "national interest" and "Australia's approach to climate change, including our active domestic policy response, is based upon the reality that climate change is occurring - but not any presumption about precise temperature rises" (Kemp, 2003, np). While insisting that Australia will meet its Kyoto commitments, the Government steadfastly refuses to ratify the Protocol.

> If Australia were to ratify, Kyoto would create obligations for Australia that are not imposed on many of our regional trading competitors. If these arrangements continued over the longer term, industries could be driven overseas by competitive pressure to countries that might not have as stringent environmental standards as Australia. Such a situation would mean an increase in global greenhouse emissions, not the reduction we are all seeking.
>
> If Australia were to ratify today, we would be sending the message that we were prepared to impose legal obligations and significant costs on our industries that they may not face in the longer term if they were to transfer their operations to countries which have rejected such obligations, and which for the most part have so far shown no interest in moving to such a regime post-Kyoto. We are not prepared to start shipping Australian industries and jobs overseas, even though some of the States are apparently prepared to do just that (Kemp, 2003, np).

There have been a number of attempts to initiate Bills to address the issue of climate change: the Convention on Climate Change (Implementation) Bill 1999 and the Kyoto Protocol (Ratification) Bill 2002 by Greens Senator B. Brown, the Kyoto Ratification Bill 2003 by Mr. K. Thomson, Shadow Minister for the Environment, and the Kyoto Ratification Bill 2003 by Senators B. Brown and K Lundy. Numerous debates have been

held in Parliament and they have been long and acrimonious. The Senate Environment, Communications, Information Technology and the Arts Legislation Committee (ECITA) in its report on the Kyoto Ratification Bill 2003 [No. 2] (2004) summed up many of the arguments for and against ratification of the Kyoto Protocol (Table 4-4). It should be noted that it is beyond the scope of this thesis to explore the debate surrounding the Kyoto Protocol. Information from the ECITA report is presented as background information to identifying the potential impact of non ratification on a fledgling renewable energy industry. Renewable energy lobbyists provided evidence on the potential impact of non-ratification:

- Mr Ric Brazzale of the Australian Business Council for Sustainable Energy (BCSE) told the Committee of a renewable business export delegation to Brazil, which was effectively told that there was no point in dealing with Australian companies because of Australia's anti-Kyoto stance (The Senate Environment Communications Information Technology and the Arts Legislation Committee, 2004, 11).

- Ms Libby Anthony of the Australian Wind Energy Association (AusWEA) suggested that it was important for Australia to ratify the Protocol in order to send a strong signal to the markets that we need to be tightening our belts with regard to energy efficiency. This would also pave the way towards developing a more robust market for renewables in Australia as well as facilitating a stronger move into export markets (The Senate Environment Communications Information Technology and the Arts Legislation Committee, 2004, 11).

- Environment Business Australia suggested that the European Union was seeking a 20% market share target for renewable energy by 2010, a market in which Australia would be unable to compete on an equal footing without ratification (The Senate Environment Communications Information Technology and the Arts Legislation Committee, 2004, 13).

- Witnesses for the sustainable and renewable energy sector pointed to the jobs boost that would result from the growth in their industry following a ratification of the Protocol. Ms Anthony of AusWEA suggested that for every job in the coal industry, there were six jobs in the renewable industry. Mr Brazzale of BCSE pointed to another advantage of renewable energy, namely that job opportunities are spread widely around Australia.

Table 4-4 The Senate Environment, Communications, Information Technology and the Arts Legislation Committee (2004) Arguments in Favour Of and Against Ratification of the Kyoto Protocol

ARGUMENTS IN FAVOUR OF RATIFICATION	ARGUMENTS AGAINST RATIFICATION
Australia needs to be, and be seen to be, a good global environmental citizen and to be seen to be serious about tackling greenhouse gas emissions.	Australia's ratification would make no difference to the coming into effect of the Kyoto Protocol.
If it fails to ratify, Australia will be excluded from potential emissions trading and CDM benefits.	Australia is already committed to meeting its emissions target, whether it ratifies or not.
If it fails to ratify, Australian industry will be adversely affected and some firms may be driven offshore with consequent loss of Australian jobs and profits.	The Kyoto Protocol will not be effective in reducing global emission levels.
Assuming that the Kyoto Protocol enters into force, and Australia fails to ratify, in accordance with Article 13(2) of the Protocol it will not be eligible to participate formally in the proceedings of any session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, and will therefore not be eligible to participate formally in negotiations on the post-2012 period that occur within the meeting of the Parties to the Kyoto Protocol.	The Kyoto Protocol will harm Australian industry.
Ratification would allow Australia to meet its 108% emissions target at lower cost.	Cost-benefit analyses suggest that the costs of the Kyoto Protocol exceed its benefits.
If developed countries embraced the Protocol, developing countries would be more likely to accept emissions targets in commitment periods after 2012.	The volume of greenhouse gas emissions from a given country is not a good measure of that country's impact on global emissions.
Ratification need not be a permanent or irreversible commitment.	The Protocol lacks credible compliance measures.
	[There are] alternative mechanisms.
	[There are] technological solutions.
	[There are] problems associated with Kyoto's flexibility measures.

Source: (The Senate Environment Communications Information Technology and the Arts Legislation Committee, 2004, v).

- The Renewable and Sustainable Energy Roundtable says in its submission that: If Australia does not ratify the Kyoto Protocol, access by Australia's renewable and sustainable energy companies to flexibility mechanisms (such as international emissions trading, the Clean Development Mechanism or Joint Implementation) will be restricted. This is likely to significantly impact on the international competitiveness of Australian firms as well as the continued growth and development of renewable and sustainable energy. In order to capitalise on the significant opportunities for the export of both technology and expertise that will result from participation in these markets, it is essential that Australia participate (The Senate Environment Communications Information Technology and the Arts Legislation Committee, 2004, 36).

- Similarly, the Australian Business Council for Sustainable Energy states that:

- Not ratifying the Kyoto Protocol reduces opportunities for Australian companies to sell emission permits to other developed countries that do not have the abatement opportunities that we have; and
- Not ratifying reduces export opportunities for Australian businesses, particularly to developing economies. This makes it more difficult to develop globally competitive industries, particularly in sustainable energy and environment industries (The Senate Environment Communications Information Technology and the Arts Legislation Committee, 2004, 36).

The ECITA report clearly states that the renewable energy industry has the most to lose if Australia fails to ratify the Kyoto Protocol. International competitiveness and full participation in Kyoto processes are considered to be of key importance. However, while non ratification means that the Commonwealth Government will not formally be allowed to participate in COP meetings dealing with the Kyoto Protocol, Article 13(2) of the Protocol states that Australian businesses will be able to participate in the Protocol's flexibility mechanisms (The Senate Environment Communications Information Technology and the Arts Legislation Committee, 2004, 37). ROUNDTABLE, the renewable and sustainable energy industry body, in a submission to the AGO regarding Australian business participation in CDM stated the following:

> Australian firms, while not theoretically excluded from the Kyoto flexibility mechanisms, are experiencing difficulties in securing CDM projects in our region. The difficulties are predominately due to the fact that Australia cannot be a "Designated National Authority" without Kyoto ratification. The preference of the current CDM market is for CERs [Certified Emission Reductions] created from projects undertaken by Kyoto Parties over and above those projects involving non-Kyoto parties. This preference is based on the uncertainty surrounding the value/validity of CERs and ERUs [Emission Reduction Units] from non-Kyoto Parties in the emerging carbon market, and a consumer perception that Australia, through lack of Kyoto ratification, is not really committed to the issues at hand (Renewable and Sustainable Energy ROUNDTABLE, 2004, np).

It will be interesting to see which companies, if any, manage to take the lead in this regard should the Commonwealth Government continue its policy of non ratification of the Kyoto Protocol.

Should the Howard Government remain in power after the 2004 national elections, it is likely to maintain its current stance, but even that could change depending on what happens in the national elections in the USA. To date, the relationship with the USA has

bolstered the Howard Government's stand regarding climate change and the Kyoto Protocol.

4.2.4 The Australia/USA Relationship

The political relationship between Australia and the USA, and the social and economic similarities between these two developed countries has had a significant influence in the way that Australia has dealt with climate change negotiations and renewable energy developments.

> The US is by far the single most important national actor within the global climate regime for reasons of both historical and practical significance. Historically, US federal support has fostered pioneering research on several aspects of climate change without which climate change might not be the global policy concern that it is today. From a pragmatic perspective, meanwhile, the US remains the single largest contributor of greenhouse emissions, both on a gross and per-capita basis (Agrawala & Andresen, 2001, 118).

As discussed in Section 4.2.1 Australia, like the USA, is ranked as the highest per capita greenhouse gas emitting country. Emissions have increased in both countries over the last decade (Table 4-1). Both countries have refused to ratify the Kyoto Protocol: neither "would sign a treaty which would result in serious harm to the economy" (Commonwealth, 17 June 1997, 4315, Senator Hon. Warwick Parer). The main reasons given for opposing the Protocol are the same: rejection of fixed targets for greenhouse gas emissions but instead a preference for voluntary solutions; and insistence on the participation of developing countries in any agreement. The main opposition parties: the Labor Party and the Democrats respectively, support ratification of the Protocol. Both countries seem to have ignored the fact that developing countries would be drawn into the agreement in the second commitment period of the Protocol. Politically, Australia since 1996 and the USA since 2001, have had conservative governments with clear allegiance to big business, and specifically to the fossil fuel industry (Agrawala & Andresen, 2001). Both countries' "preferred set of policy responses has been constrained by a national culture that gives primacy to the market over the state" (Agrawala & Andresen, 2001, 117). The economic concern in both countries has been the alleged impact on employment, the loss of jobs, the loss of trade competitiveness in energy intensive products and associated increase in the cost of living. However, "[t]he extent of these

economic damages, and whether they are more than offset by benefits stemming from lowering of energy demands through energy efficiency improvements, investments in R&D, deregulation, and growth opportunities in renewable energy, of course, remains an open question" (Agrawala & Andresen, 2001, 127). Supporting Agrawala and Andresen's assertion that there are benefits in renewable energy is a recent study undertaken by the Energy and Resources Group at the Goldman School of Pubic Policy, University of California. By reviewing and analysing 13 independent studies "that analyse the economic and employment impacts of the clean energy industry in the United State and Europe" (Kammen, Kapadia & Fripp, 2004, 1), a job creation model was developed to look at different energy scenarios. The studies key result demonstrated: "Across a broad range of scenarios, the renewable energy sector generates more jobs than the fossil fuel energy sector per unit of energy delivered" (Kammen, Kapadia & Fripp, 2004, 2).

Returning to the similarities between Australia and the USA, on 19 June 2001, Senator B. Brown asked Senator Hon. R. Hill to "name one specific point of difference between the position President Bush has taken on the substance of the Kyoto protocol and what has been negotiated and that of the Howard Government?" (Commonwealth, 19 June 2001a, 24603, Senator Bob Brown). Senator Hon. R. Hill's response was as follows:

> A fundamental difference is that the United States is not prepared to accept the target that it agreed to in Kyoto. Australia is prepared to accept the target it agreed to in Kyoto. We got a target that is difficult for Australia to achieve but which can be achieved, and we are committed towards that outcome. That is why we have the new renewable energy legislation" (Commonwealth, 19 June 2001b, 26404, Senator Hon. Robert Hill).

With the commitment of almost "$1 billion" in investment for greenhouse gas abatement the Commonwealth Government repeatedly states that Australia is "within striking distance of meeting the 108 per cent emissions target agreed at Kyoto" (Commonwealth, 2 December 2003, 18768, Senator Hon. Robert Hill). National greenhouse gas inventory statistics, however, indicate that total net emissions were 1.3 per cent (7.0 Mt) higher in 2002 than in 1990 (Australian Greenhouse Office, 2002, 5).

Like the USA, the Commonwealth Government has also made it clear that they are not prepared to risk losing market share for an ineffective and flawed process that "would

deliver only about a 1% reduction in global greenhouse gas emissions"(Commonwealth, 24 November 2003c, 22678).

> Without the participation of the United States and major developing country emitters such as China and India the Kyoto Protocol will make only a minor difference to global emissions. In addition, the absence of major emitters against which Australia must compete means there are risks for a country such as Australia burdening its own industry with additional costs – including the risk of potential investment in resources or energy-intensive industries moving elsewhere (Commonwealth, 2 December 2003, 18768, Senator Hon. Robert Hill).

It appears that, for the foreseeable future with the current Governments remaining in power, Australia and the USA will continue to collaborate and pursue a "blocking role on the international arena" (Agrawala & Andresen, 2001, 117).

Collaboration through the Climate Action Partnership (CAP) (as discussed in Section 2.3) indicates that it is not renewable energy developments that will receive attention.

> Real progress is being made through the Partnership in forging links and exchanging knowledge in the areas of clean coal technology and carbon capture and storage. A highlight has been the joint government and industry mission to the US and Canada in October last year that showcased the latest technologies in these areas and laid important groundwork for joint projects (Kemp, 2003, np).

However, it is interesting to note that the ROUNDTABLE undertook an industry motivated mission to the USA, in May 2004, to focus on renewable energy initiatives under the CAP.

Another aspect of the Australian/USA relationship that is likely to require attention regarding renewable energy and climate change issues is the proposed US-Australian Free Trade Agreement that is currently under consideration. Senator B. Brown has called on the Commonwealth Government to:

> ensure that the agreement does not inhibit Australia's ability to reduce greenhouse gas emissions, including by giving United States coal and electricity companies the right to challenge or seek compensation from Australian governments which act to ameliorate global warming (Commonwealth, 24 November 2003b, 17521, Senator Bob Brown).

Possibly of more immediate importance for the renewable energy industry is the fact that research has shown that "free trade agreements" act as "preferential trade arrangements" and effectively divert more "trade from non members than they have created amongst members" (Adams et al., 2003, xii). This is a critical issue given Australia's proximity to

the Asia Pacific Region where the majority of future renewable energy developments have been predicted to be.

Opposition to the Australia/USA relationship has been voiced in Parliament, not only as a result of the actions of the "Coalition of the Willing" but also because of the climate change policy and non-participation as "good global citizens".

> One of the real concerns is that we have to come to grips with the fact that we should not just follow in the wake of the Americans. It is not 'all the way with George W.'; it is a matter of showing that we can act in an independent fashion but we are willing to join with the rest of the global community to tackle what in fact is very much a global phenomenon (Commonwealth, 19 March 2002, 1542, Harry Jenkins).

4.2.5 The Two Per Cent Mandatory Renewable Energy Target

Understanding Australia's position as the world's highest greenhouse gas emitter, and acknowledging the Commonwealth Government's negotiating position to claim the second highest Kyoto target of all developed countries, places in perspective the Commonwealth Government's sole legislative measure to address greenhouse gas emissions; the two percent MRET. The mandatory target for electricity retailers to source an additional two per cent of electricity from renewables was announced in 1997 as part of Prime Minister Howard's *Safeguarding the Future* statement. Over the next two years the two per cent proposal was debated and industry consulted, and the Bill was finally introduced to Parliament in June 2000. After some acrimonious debate in the Senate, the Act was passed in February 2001. Many of the key points of disagreement remain unresolved and are still of concern in 2004. Greens Senator B. Brown stated "[t]his legislation is ... an environmental innovation, but in fact it has become an environmental travesty" (Commonwealth, 9 October 2000, 18108, Senator Bob Brown). His criticism of the Act was linked to some major concerns. First, in comparison to renewable energy targets by other developed countries of between 20 and four per cent (Table 4-5), Australia's two per cent target falls considerably short. In his criticism Senator B. Brown did not take into consideration the existing 10 per cent of renewable electricity provided by hydro electric power generation. Despite many calls from Labor, the Democrats, the Greens, as well as renewable energy industry associations, that a higher target would create the market forces needed to establish more development and

Table 4-5 Renewable Energy Targets established for Developed Countries as stated by Senator Bob Brown

Country	Renewable target %
Denmark	20.3
Greece	11.5
Sweden	10.9
Finland, Ireland, Spain	10
United Kingdom, Italy, the Netherlands	9
Germany	8
Portugal	7
France, Belgium	6
Austria	5
United States	4
European Union overall	8.2
World average aim over the next 10 years	7.4

Source: (Commonwealth, 28 August 2000, 16746, Senator Bob Brown).

thereby guarantee development in the fledgling industry, the Howard Government refused.

Second, the stated two per cent would in fact prove not be a "true" two per cent. When the two per cent target had been proposed it had been estimated that the annual growth rate in electricity demand would be 2.1 per cent between 1996 and 2010. However, the actual growth in electricity demand per year between 1996 and 2000 averaged 3.8 per cent. Therefore, with electricity consumption increasing, and the MRET target staying at 9500 GWh, by 2010 the proclaimed two per cent will be much less. Senator B. Brown pointed out that "[t]he scheme is no longer a commitment for an extra two per cent of renewables but rather for an exact figure of 9,500 gigawatt hours, which will account for much less than the two per cent of the projectedelectricity consumption in the year 2010" (Commonwealth, 28 August 2000, 16744, Senator Bob Brown). Democrat Senator L. Allison provided information regarding the extent to which the "two per cent" would undershoot a true two per cent:

> [N]ew figures show that there is an increase projected in [electricity] consumption over that time of 27,000 gigawatt hours. That means that, if the two per cent were applied to the actual figures as opposed to the earlier projected ones, we would need to look at 13,000 gigawatt hours of electricity by the year 2010, not 9,500. That may not sound like a terribly substantial problem, but the point is that this bill has been weakened and watered down since day one (Commonwealth, 27 June 2001, 25232, Senator Lynette Allison).

Senator B. Brown's third, but by no means minor, issue related to what was defined as renewable in the Act. The Greens became vehemently opposed to the Act because:

> [i]t ends up including extraordinarily environmentally destructive measures as renewable green energy. This includes chopping down, woodchipping and burning wild forests in Australia to provide energy and calling that renewable (Commonwealth, 3 October 2000, 17721, Senator Bob Brown).

In addition, the fact that hydro electricity from large dams was to be included in the Act was an anathema due to the environmental impact of large dams on the environment. Together with the Democrats, the Greens proposed that the definition of renewable energy sources should include that sources were ecologically sustainable. In this regard their efforts were successful and the issue of ensuring ecologically sustainable sources for renewable energy was incorporated into Section 3 of the Act. Large scale hydro electric power generation and biomass from native forests, however, were included as eligible sources of renewable energy.

The debate regarding the inclusion of existing, large scale hydro electric power stations as a renewable source and capable of earning RECs is significant as it had important ramifications for the renewable energy industry. The issue of contention was not only that impounding rivers for hydro electricity was environmentally damaging. The main concern revolved around the fact that existing hydropower stations could obtain RECs if they increased their generation capability above a set baseline. Except for extenuating circumstances, baselines for existing hydro generators were based on a period of a three year average prior to 1997 to accommodate climatic variation. Increasing generation capacity to obtain RECs without investing in new renewable sources, or achieving any reduction in greenhouse gas emissions, was considered by many to undermine the objectives of the Act and was, therefore, unacceptable (Australian EcoGeneration Association, 2002).

Hydro power generators with an established power base, however, had historically been the major suppliers of renewable energy in Australia. After the Howard Government's 1997 announcement, hydro power generators moved quickly in anticipation of the legislation and initiated plans to upgrade existing power stations as well as extend their operations into alternative renewable energy supplies. An important consequence was the establishment of fledgling but active renewable energy lobbies incorporating such

organisations as Hydro Tasmania, Pacific Hydro, Snowy Hydro Limited and Southern Hydro Partnership and Stanwell Corporation. New associations formed such as the Renewable Energy Generators of Australia (REGA), Sustainable Energy Industry Association (SEIA), Australian Wind Energy Association (AusWEA), and ROUNDTABLE. These bodies have become influential in the development and implementation of the Act in Australia, but not as powerful as the long established fossil fuel lobby.

The influence of the fossil fuel lobby on MRET and the renewable energy industry became evident in a number of ways. One of the most significant impacts came in the form of COAG's energy market review in 2002. Chaired by the Hon. W. Parer the review report entitled *Towards a Truly National and Efficient Energy Market* (Commonwealth of Australia, 2002) recommended that MRET be stopped immediately and replaced by an emissions trading scheme within three years. The review's sentiments were clear:

> The rationale for a scheme which focuses only on renewable rather than on greenhouse benefits is the perception of the need for the conservation of non-renewable resources. This is, however, not an issue for Australia. Consequently any arbitrary diversion of investment away from more efficient carbon reducing options and towards renewables will burden the economy with unnecessary costs (Commonwealth of Australia, 2002, 24).

The effect of the recommendation was immediate and "led to significant investment uncertainty in the renewable energy industry and to a stalling of investment. Its proposal for a scheme to compensate renewable energy operators for the cessation of MRET was not seen by the market as sufficient to maintain investor confidence in the industry" (Commonwealth of Australia, 2003b, xix). BCSE representing the renewable energy industry immediately stated that "scrapping the MRET would cost thousands of Australian jobs and billions of dollars of investment, much of it in regional Australia" (Commonwealth, 11 December 2002, 10234, John Murphy). The Labor Opposition also strongly opposed the review's findings and its support for coal related abatement technologies. Eighteen months since the review was released and the uncertainty created by the Parer Report still lingers. It is considered that the uncertainty will remain until the Government reveals its intentions regarding the 2003 MRET Review.

More can be construed of the Parer Report findings then initially apparent. In 1998, a motion of censure was brought against Prime Minister Howard by then Leader of the

Opposition, Hon. K. Beazley, due to the fact that Senator Hon. W. Parer had strong ties with the coal industry owning "significant coal mining interests" (Commonwealth, 12 March 1998, 1175, Hon. Kim Beazley). Not only did Senator W. Parer have a significant number of coal interests, as Minister of Resources and Energy and a person directly involved in the Government's greenhouse strategy, Hon. W. Parer had "publicly questioned the greenhouse effect" (Commonwealth, 11 December 2002, 10234, John Murphy). He is "on the record as saying that greenhouse issues will be forgotten in 10 years" (Commonwealth, 1 October 1997, 7312, Senator Meg Lees). The "fossil fuel apostle['s]" (Commonwealth, 1 October 1997, 7311, Senator Meg Lees) (as Hon.W. Parer has been called) lack of support for MRET as expressed through the Parer Review is, therefore, understandable.

In addition, while initially the recommendation that an emission trading scheme be established would seem contrary to Hon. W. Parer's coal mining interest, the apparent contradiction does not stand scrutiny. The Parer Review in practice proposed to "[e]xempt the traded goods sector from the effects on the emissions trading scheme until Australia is part of a world wide greenhouse scheme" (Commonwealth of Australia, 2002, 25). Exclusion of Australia's energy intensive industries from an emissions trading scheme would, therefore, not place them "at a large competitive disadvantage" (Commonwealth of Australia, 2002, 25). Instead, the review recommended that the businesses would have to show they applied best practice techniques regarding energy use and ensure that they did not contribute to higher greenhouse gas emissions.

Mr. J. Murphy MP verbalised the Opposition's concerns: "is this yet another case of the fox being in charge of the henhouse? Wouldn't the public interest be best served by a chairman who was widely accepted as being unbiased?" (Commonwealth, 11 December 2002, 10234, John Murphy).

A second example of the impact of the fossil fuel lobby was evident in the debate surrounding the cost of MRET to electricity users. "MRET is effectively an implicit subsidy to the renewable energy industry because it has the effect of transferring financial resources, at the expense of retailers and energy users, to the renewable energy industry" (Commonwealth of Australia, 2003b, 34). The cost of MRET, therefore, results in higher electricity prices. The extent to which electricity costs have been and will be raised in the

life span of MRET have been estimated by a number of economists as provided in Table 4-6.

Table 4-6 Range of Estimated Increases in Electricity Costs as a result of MRET

Name of Consultants	Report Commissioned by	Per cent increase in average cost of electricity (%)	Average cost of electricity ($ per MWh)
Tony Beck Consulting and Energetics (1999)	Renewable Target Working Group	1-3	
McLennan Magasanik Associates (2003)	Origin Energy		0.9 - 2.1 in 2010
McLennan Magasanik Associates (2003)	AGO	2.4 - 3.6 - 3	0.97 - 1.44 in 2008 to 2012 - 1.23 in 2013 to 2020
ACIL Tasman (2002)	Australian Aluminium Council, Australian Coal Association, Minerals Council of Australia	10.8	2.38 in 2010

Source: (Commonwealth of Australia, 2003b, 34 - 36).

Whereas two consultant organisations estimated average electricity costs to be minimal and below four percent (McLennan Magasanik Associates, 2003; Tony Beck Consulting and Energetics, 1999), the report commissioned by the fossil fuel lobby - the Australian Aluminium Council, Australian Coal Association and Minerals Council of Australia,(ACIL Tasman, 2002) estimated costs to increase over 10.8 per cent. The ACIL Tasman estimate, together with the ABARE report findings, has had a significant impact on the Commonwealth Government's position and has reinforced the perspective that such increases in electricity prices could cause Australia's energy intensive industries to become less competitive in the world market. In addition, the estimated high cost of MRET has reinforced the Commonwealth Government's argument not to increase the MRET target. Hon. Dr. D. Kemp has stated that a five per cent MRET target "would be to impose an $11.5 billion cost on Australian industry by the year 2020, with a cumulative negative impact on GDP of billions of dollars" (Commonwealth, 25 May 2004, 28969, Hon. David Kemp). This alleged high cost and purported loss of jobs is the Howard Government's justification for not increasing MRET. However, with regards to the cost impacts of MRET the MRET Review 2003 found that:

> MRET imposes some additional costs on electricity users, it has a very small negative impact on the Australian economy as a whole. Potentially the main negative impacts will be on energy intensive, trade exposed industries (Commonwealth of Australia, 2003b, xviii)
> Overall the cost impacts to date have been minimal and are likely to remain small (Commonwealth of Australia, 2003b, 36).

Two other legislative initiatives highlight shortcomings pertaining to the *Renewable Energy (Electricity) Act 2000* and its implementation. The first was the proposed *Renewable Energy (Electricity) Amendment Bill 2002* submitted to Parliament in June 2002. The Bill's intent was to give ORER more legislative and information gathering powers. Unresolved issues inherited from the passing of the original Act, however, have remained contentious and to date the amendments have not been passed. The second initiative was the *Local Community Input into Renewable Energy Developments Bill 2003* proposed by Mr. C. Zahra MP. Brought before the House of Representatives in December 2003, the Private Member's Bill was in response to growing environmental concerns regarding prolific, coastal wind farm development. The Bill was "a simple amendment to the *Renewable Energy (Electricity) Act* which would have the effect of allowing only those wind power stations that have been approved by local councils to issue renewable energy certificates. This would, in effect, return control in relation to these developments to local communities" (Commonwealth, 1 December 2003, 23315, Christian Zahra). To date no ruling has been made regarding the proposed *Local Community Input into Renewable Energy Developments Bill 2003*.

In January 2004, the long awaited MRET Review 2003 findings were released. As discussed in Section 3.3 the findings were positive but conservative. Maintaining the 9500 GWh target until 2012 was not unexpected. Increasing the target to 20 000 GWh by 2020 was considered by some to be too little too late, but nevertheless positive. The MRET Review 2003 clarified some concerns and highlighted others. With regards to Australia's two per cent target being compared with developed countries, specifically Europe, the situation was clarified (Table 4-7). Taking into consideration "the nature of the target, the starting basis and to what extent it is binding" (Commonwealth of Australia, 2003b, 231), Australia does not compare favourably. From a relatively strong base of 10.5 per cent renewables in total electricity supplied in 1997, the less than two per cent and fixed target will only provide a one per cent increase for Australia in 2010. This places the percentage share increase of Australia renewable energy electricity production in a tied second lowest position together with Texas (USA) that has an envisaged one per cent increase after a starting base position of one per cent. Portugal with an increase of only 0.5 per cent share increase in renewable energy electricity production between 1997 and 2010, has the redeeming feature that its starting base, as a percentage of renewable

Table 4-7 Summary of Overseas Renewable Energy Targets at June 2003 as Identified by the MRET Review 2003 in Comparison to Australia's Target

Country	Renewables Electricity Share in 1997 (%)	Renewable Energy Target (%)	Increased renewable electricity production 1997-2010 (GWh)	Percentage share increase
Australia	10.5	Fixed quantity	9500	1
European Union	14	22.1 total electricity share by 2010	336,600	8.1
Austria	70	78.1 by 2008	16,300	8
Belgium	1	6 by 2010	5,440	5
Denmark	9	29 by 2010	9,700	20
Finland	25	40 by 2010	14,700	7
France	15	21 by 2010	46,900	6
Germany	5	12.5 by 2010	51,500	8
Greece	9	20 by 2010	10,600	10.5
Ireland	4	500MW by2005	3,700	9.5
Italy	16	18	43,100	9
Japan	10	3 in 2010	Not provided	Not provided
Luxembourg	2	5.7 by 2010	360	3.5
Netherlands	4	10 by 2020	12,400	5.5
New Zealand	72	Extra 2% in share of total energy	Not provided	Not provided
Portugal	39	39 by 2010	14,000	0.5
Spain	20	12 of total energy demand by 2010	39,400	9.5
Sweden	49	By 10 terrawatt hours (TWh) from 2002 to 2010	25,500	11
United Kingdom	2	10.4 in 2011	43,000	8.5
Texas USA	1	2	3,000	1

Source: (Commonwealth of Australia, 2003b, 227).

electricity consumed, was 38.5 per cent. Luxembourg will increase its renewables based generation percentage increase in electricity share more than Australia.

ABARE provided the MRET Review 2003 Panel with information indicating that "[b]ased on recent electricity [ABARE (Australian Bureau of Agricultural Resource Economics, 2003a)] projections for 2020 of 284 000 GWh, the resulting market share of renewables would have fallen to around 9 per cent" (Commonwealth of Australia, 2003b, 120). The MRET Review 2003 states that "[b]ased on current electricity market estimates, an additional 20 000 GWh would approximate an additional 2 per cent of overall demand in 2020 (from the 1997 baseline) (Commonwealth of Australia, 2003b,

xxiii). In addition, evidence from the 264 submissions provided to the review, enabled the Panel to conclude that:

- By 2007, sufficient capacity is expected to have been installed to meet the MRET target of 9500 GWh for 2010. As a consequence, investment is expected to fall away rapidly.
- A further reason advanced for the anticipated decline in investment is that most renewable projects require high levels of upfront capital investment and a minimum payback period of 15 years. Under current MRET settings, RECs will not be available beyond 2020, so that by 2007 the available payback period for investments will have fallen below the required threshold (Commonwealth of Australia, 2003b, xvii).

The MRET Review 2003 concluded "that no change to the target is warranted prior to 2010" (Commonwealth of Australia, 2003b, 127). The rationale for this decision was predominantly based on modeling undertaken by McLennan Magasanik Associates (2003) for the AGO. It was estimated that raising the MRET target between a revised two per cent to ten per cent would increase the price in wholesale electricity between 1.41 to 7.07 $/MWh for the period 2008 – 2012 (Commonwealth of Australia, 2003b, 124). The MRET Review 2003 also stated that:

> Any increase in the target in the short term would be detrimental to future renewable industry development and run counter to the policy intent of MRET. An increase in the MRET target prior to 2010 would also increase the overall cost of the measure and potentially expose liable parties and electricity consumers to higher electricity prices (Commonwealth of Australia, 2003b, 126).

After 2010 and beyond 2020, however, the target should increase at the same existing rate, and stabilise in 2020 at 20 0000 GWh. The question is asked – is this too little, too late?

With regard to concerns expressed by the Green's that the Act would initiate a free for all of renewable energy generation from native forests, the MRET Review 2003 indicated that there has been a general lack of industry support for the use of wood waste from native forests. Up until August 2003 no RECs had been created via this means. ORER provided information indicating that hydro and solar water heaters had provided the largest growth in renewable energy generation (Table 4-8).

Table 4-8 Per Cent Growth Rate in Renewable Energy Certificates (RECs) per Renewable Energy Technology as a result of MRET, up to 18 August 2003

Type of Technology	Per cent growth in RECs
Hydro	36
Deemed Solar Water Heaters	26
Wind	11
Bagasse Cogeneration	10
Landfill Gas	8
Wood Waste	4
Black Liquor	4
Sewage Gas	1

Source: ORER (Commonwealth of Australia, 2003b, xvi).

Concerning baselines, the MRET Review 2003 Panel recommended no changes be made to the existing baseline methodology. They concluded that the approach was appropriate and operational. The Panel also recommended that the Renewable Energy (Electricity) Amendment Bill be accepted after accommodating identified changes.

In contrast to Senator W. Parer who had recommended that MRET be scrapped, the MRET Review 2003 Panel stated throughout all of their deliberations that "there are sound policy reasons for retaining and refining MRET" (Commonwealth of Australia, 2003b, xix).

4.2.6 The Greenest Budget and Research and Development Priorities

Since 1997 the Commonwealth Government has made commitments of almost $1 billion towards Australia's greenhouse gas emissions response (Department of Foreign Affairs and Trade, 2002; Kemp, 2003). This funding has been aimed at: establishing the AGO; providing incentives for industry and communities to reduce emissions; the development and implementation of MRET; the establishment of strategic action plans and agendas; funding grants; commercial research and development; and the development of low emission technologies (Kemp, 2003). As a result of this financial commitment the Howard Government has been called by its members "the greenest government in Australia's history" with "the greenest budget in Australia's history" (Commonwealth, 29 May 2002, 2599, Hon. Peter Slipper).

Exactly what budget was allocated to renewable energy initiatives is difficult to determine from Parliamentary debates. Prime Minister Howard allocated $126 million to renewable energy measures in his 1997 landmark speech (Table 2-5). On 22 June 2000 Hon. Dr. S. Stone, Parliamentary Secretary to the Minister for Environment and Heritage, stated the budget was $362 million, a few days later on 29 June 2000 this had increased to $400 million (Commonwealth, 29 June 2000a, Malcolm Washer), and then $388 million with $300 million going to solar technologies (Commonwealth, 29 June 2000, Hon. Dr. Sharman Stone). In December 2002 this had again changed to $377 million (Commonwealth, 12 December 2002c, Hon. Dr. Sharman Stone). According to DFAT (2002), $380 million over five years has been allocated to the fledgling renewable energy industry. The key initiatives identified were:

- providing regional and outback Australia with funding to convert from diesel-based electricity supplies to renewable energy technologies;
- a photovoltaic rebate program to encourage the installation of photovoltaic cells on households and community use buildings;
- support to ensure the development, commercialisation and promotion of the Australian renewable energy industry (Australian Department of Foreign Affairs and Trade, 2002, np).

Information provided to Parliament, regarding the same financial commitment differed both in amount and nature. It was announced that $300 million had been made available for renewable energy support focused on the following areas:

- MRET - "world first legislation that guarantees that enough new renewable electricity is generated over the next 10 years to supply the residential needs of a city of four million people. This initiative is being achieved by establishing an innovative market in renewable energy certificates and is expected to deliver in excess of $2,000 million of new investment in renewable energy in Australia".
- Development of an action agenda – "to guide the development of a sustainable and internationally competitive renewable energy industry in Australia with target annual sales of $4 billion by 2010".
- Targeted grants – "$6 million of targeted grants funding to address financial institutional barriers to the uptake of renewable energy, assessment of renewable energy resources, development of standards for equipment and training and accreditation of system designers and installers".
- Diesel fuel rebate – "funding for rebates on equipment of around $20 million, saving over 50 million litres of diesel fuel each year".
- Photovoltaic uptake – "an initiative of increasing the use of photovoltaic technology will enable around 6,000 householders and owners of community buildings such as schools to convert sunlight into electricity and run valuable education programs".

- Grant and equity programs - "worth over $70 million to support commercialisation of new technologies and applications that generate and use renewable energy. Over 60 projects have been funded for a wide range of renewable technologies, including solar photovoltaic, solar thermal, biomass, hot dry rock, wave, hydro and wind" (Commonwealth, 29 May 2002, 2598, Hon. Peter Slipper).

A number of programs were identified for funding over a period of four years (Table 4-9) that are still in existence today.

Table 4-9 Renewable Energy Related Funded Programs

Program	Funding over 4 years - $ m
Photovoltaic Rebate Program	31
Remote Renewable Power Generation Program	264
Renewable Energy Commercialisation Program	55,60
Renewable Energy Equity Fund	26,60
Greenhouse Gas Abatement Program	400
Total	777

Source: (Commonwealth, 24 September 2001, 31347, Hon. Warren Truss).

The Howard Government's claim to having the "greenest budget" has been vigorously disputed. Before Prime Minister Howard announced his greenhouse package in 1997 the Labor Party questioned him about budgetary cuts made to programs established under Prime Minister P. Keating's Labor Government:

> Can the Prime Minister confirm that his yet to be announced greenhouse package will do anything more than partly refill a funding hole he dug by cutting more than $100 million from Labor's greenhouse programs, including $37 million from abolishing the Energy Research and Development Corporation, $14 million from the national energy efficiency program and $20 million by scrapping the one billion trees program? Don't these cuts and the loss of about $300 million for the environment under the LEAP program dwarf any greenhouse gas initiatives you are contemplating (Commonwealth, 17 November 1997a, 10467, Hon. Duncan Kerr).

Analysis of information provided through Parliamentary debate indicates a number of issues regarding budget allocation and funding. For example, Labor MP Mr. J. Fitzgibbon enquired into the funding for the Renewable Remote Power Generation Program (Commonwealth, 19 August 2002a, Joel Fitzgibbon). A sum of $264 million had originally been budgeted for the Program but it became clear that only $98,38 million had been allocated to the States and Territories (Table 4-10). Of this amount, by the end of May 2002, only $13,687 million had been spent.

Table 4-10 The Allocation of Renewable Remote Power Generation Program Administered Funds

State / Territory	Sub-Program	Funding ($m)
Western Australia	Remote Area Power Supply Program	18
	Renewable Energy Water Pumping Program	3,50
Northern Territory	Renewable Energy Rebate Program	38,20
Queensland	Working Property Rebate Scheme	8
	Renewable Energy Diesel Replacement Scheme	22,30
South Australia	RRPGP in SA	7,60
New South Wales	RRPGP in NSW	0,78
Total		**98,38**
Original Amount Budgeted		**264**

Source: (Commonwealth, 19 August 2002b, 5148, Hon. David Kemp).

Budgetary under spending was also identified by the Australian Audit Office when undertaking an audit of the AGO in 2002-03. Up until 30 June 2003, of the $873.7 million budgeted for seven key greenhouse programs only "$204,4 million - less than a quarter of the amount the Government originally proposed" (Commonwealth, 9 March 2004, 26282, Kelvin Thomson) had been spent. TAI produced a report detailing Government spending on greenhouse programs (Pollard, 2003). It states: "[a]fter taking into consideration all departmental greenhouse spending, the Howard Government would need until after 2008 to deliver on its claim that it is spending $1 billion on greenhouse programs" (Pollard, 2003, 6). It is likely that the Commonwealth Government will continue to be criticised for not ensuring that the funds available are effectively distributed and implemented.

The allocation of between $300 million and $380 million over five years to establish a fledgling renewable energy industry, throughout Australia, needs to be considered in relation to the seven States and Territories that would be competing for those funds. $10.8 to $8.5 million per year per state to develop, implement and maintain a range of renewable energy developments could be considered insufficient.

The Commonwealth Government has also been strongly criticised for its alleged bias towards the funding of renewable energy research and development. In 1996, the Labor Government under Prime Minister P. Keating established the Energy Research and Development Corporation (ERDC) to investigate alternative and renewable energy options. When the Liberal/National Coalition Government under Prime Minister Howard came to power in 1996 an election promise was made to "encourage the development and use of new and renewable forms of energy and promote end-use energy efficiency ...

[and] maintain current support for the Energy Research and Development Corporation" (Commonwealth, 23 September 1997b, 8161, Stephen Smith quoting John Howard). However, in 1997, the Howard Government abolished the ERDC purportedly due to expenditure cuts necessitated by a budget deficit of $10,5 billion left by the previous Labor Administration (Commonwealth, 27 September 1997, Hon. John Howard). The closure of the ERDC had detrimental implications for research and development into alternative energies. It also put into question the continuation of implementing agreements with the IEA for which the ERDC was the signatory body. On questioning by Senator B. Brown over the fate of the ERDC, Senator Hon. W. Parer revealed that within the Government's overall fiscal objectives, funding for coal related research and development continued unabated and with considerably greater funding than attributed to renewable energy investigations (see Table 4-11). Senator B. Brown later made the point

Table 4-11 Breakdown of Funding to Cooperative Research Centres per Energy Fuel

Organisation	Type of Energy Fuel	Funding ($ m)
Commonwealth Scientific and Industrial Research Organisation (CSIRO) Energy Research and Development expenditure in 1995- 96:	Coal	18,72
	Other fossil fuel	13,79
	Renewable energy	5,05
	Energy Efficiency	4,72
	Other	2,12
Commonwealth contributions to the five energy-related Cooperative Research Centre's (CRCs)	CRC for Renewable Energy including photovoltaics, solar thermal, electric windows and wind.	10,25 over 7 years
	Petroleum CRC	17,34 over 7 years.
	Mining Technology and Equipment CRC - approximately 25% of activities are coal related.	18,76 over 7 years
	CRC for New Technologies. from Lowrank Coal	13,77 over 7 years
	Black Coal Utilisation CRC	12,11 over 7 years
The Energy Research and Development Corporation (ERDC)	Cooperative Research Centre for Renewable Energy	5,35 over the 8 years 1996-97 to 2003-04
R&D Start Program - 6 projects are energy related	Coal	17,475*
	Other fossil fuel	7,000*
	Renewables	2,995*
	Other	4,370*
Renewable Energy Industry Program		4,8 over four years 1995-96 to 1998-99

* No time frame given
Source: (Commonwealth, 27 October 1997, 8191, Senator Hon. Warwick Parer).

that "$71 million [was] being taken from the ERDC and $87 million [was] going into the coal industry" (Commonwealth, 25 March 1998, 1330, Senator Bob Brown).

Closure of the ERDC was just the beginning of funding cuts to renewable energy research and development facilities. The Australian Cooperative Research Centre for Renewable Energy (ACRE) for example, which had been established to facilitate research and development and the commercialisation of an internationally competitive renewable energy industry, was closed in 31 December 2003. Since 1998, ACRE had received Commonwealth funding of $6,61 million at approximately $1,5 million per year, except for the 2003-04 financial year when it received $0,276 million (Commonwealth, 24 November 2003a, Senator Hon. Amanda Vanstone).

When ACRE's funding was stopped it was announced by Hon. Dr. S. Stone that "[t]he decision not to fund the Cooperative Research Centre for Renewable Energy for the second time must be seen as a result of the competitive bid process" (Commonwealth, 12 December 2002c, 10588, Hon. Dr. Sharman Stone). Instead of supporting the Renewable Energy Cooperative Research Centre (CRC) three new CRC's were funded to facilitate the abatement of greenhouse gases: the CRC for Greenhouse Gas Technologies, funded over $21 million; the CRC for Antarctic Climate and Ecosystems, $23,54 million; and the CRC for Greenhouse Accounting, $1,35 million. Voicing her disapproval at the ACRE closure Democrat Senator L. Alison stated:

> ...it is hard to explain why we now have three coal CRCs—that is, the CRC for coal and sustainable development, the CRC for clean power from lignite, and the new CRC for greenhouse gas technologies, with a total funding of $50.4 million.
> The government has also given $35 million to Rio Tinto for the establishment of a sustainable minerals industry foundation which will focus on carbon sequestration—obviously, the government's preferred approach to reducing greenhouse emissions.
> At the same time, we have a zero federal dollar contribution for research into renewables. That is worth repeating: zero dollars. The coal industry does not need more government handouts. As an industry it is already heavily subsidised and it should be paying for its own efforts to reduce emissions from its operations. But our renewables industry is a fledgling industry and it needs financial support (Commonwealth, 12 December 2002a, 8048, Senator Lynette Allison).

At the centre of the controversy for research and development funding has been Commonwealth Chief Scientist Dr. R. Batterham who was appointed by Prime Minister

Howard and is a CRC board member. Dr. R. Batterham, it has been revealed, is also Chief Technologist with the multi-national coal and aluminum company Rio Tinto. This has not passed without comment. Green's Senator B. Brown questioned the potential for conflict of interest in the Chief Scientist's position and also queried where research and development funding money had been allocated.

> How did the government come to make the decision that all of the money for mineral and energy cooperative research should go to the mining industry? How did the government make the decision that none of the money would go to renewable energy? (Commonwealth, 12 December 2002b, 8050, Senator Bob Brown).

In response to concerns Minister for the Arts and Sport Senator R. Kemp stated that

> The Chief Scientist was appointed because of the wide range of experience he brings to the role, including his active, current involvement in the real world of research and development and innovation in industry through his employment with Rio Tinto. ... The arrangements for the engagement of the Chief Scientist include provisions dealing with disclosure and management of conflict of interest. Where the Chief Scientist is involved in providing advice in relation to the allocation of funds, such as in his role as a member of the Cooperative Research Centres Committee, appropriate probity arrangements are in place. The Chief Scientist has declared any conflict of interest in his role in the CRC program (Commonwealth, 15 October 2003a, 16535, Senator Hon. David Kemp).

Concerns regarding Dr. R. Batterham's impartiality are not only related to CRC funding allocation. As Chief Scientist Dr. R. Batterham has been promoting geosequestration of carbon as a cheap means of greenhouse gas abatement. He is on record as stating the potential cost of geosequestration is as low as $10 a tonne. This unsubstantiated claim has made the, as yet, unproven technology a focus in the Commonwealth Government's emissions abatement development efforts. In contrast, Senator B. Brown has stated world geosequestration cost estimates as being in the range of $40 to $200 per tonne, and has pointed out the following:

> If the Chief Scientist is giving evidence to the Prime Minister and to his advisory committee that it is $10 a tonne then no doubt they are going to view this as potentially a much more commercial reality. In the allocation of funds that flow from that, other competing potentials like solar power, energy efficiency and wind power will tend to be discounted. They will have a harder time being funded (Commonwealth, 15 October 2003b, 16536, Senator Bob Brown).

There is not only a degree of ambiguity over the Commonwealth Government's funding of research and development in relation to renewables. In the 2003-04 Budget, $11,6 million was allocated to the "Cooperative Research Centre for Carbon Dioxide Sequestration". It was quickly identified that there was no such CRC. Senator B. Brown enquired where the funding was going and why the funds were not being allocated to renewable energy research and development (Commonwealth, 23 June 2003a, Senator Bob Brown). Senator Minchin responded that the Cooperative Research Centre for Carbon Dioxide Sequestration was incorrectly titled and was in fact the Cooperative Research Centre for Greenhouse Gas Technologies. Concerning Government support for renewables Senator Minchin stated that the AGO, MRET, the REAA and the grants programs fulfilled that role (Commonwealth, 23 June 2003b, Senator Hon. Nicholas Minchin).

The evidence provided supports the case that there has been an intensification of research and development focused on geosequestration and clean coal technologies and a decrease in support for renewable energy technologies. Clearly there is justification for such developments (Dach & Wegmann, 2003). Coal will continue to be the major source of energy for some time into the future and minimisation of emissions will be essential within that time frame (Australian Coal Association, 2004). The benefit to Australia and the world should Australia succeed in developing cleaner coal and geosequestration technologies would be significant in a carbon constrained world. However, there is little justification for the Commonwealth Government failing to support substantial renewable energy research and development particularly with the renewable energy industry in its infancy.

Before concluding on budgetary and financial matters, there is one other issue of importance: exports. While it is recognised that it is the amount of energy used and not the amount of energy produced and/or exported that is of significance when calculating greenhouse gas emissions, exports are considered to be an important aspect of economic, environmental and renewable energy policy. It was revealed in November 2003 that there are significant discrepancies between funding support for renewable technologies exports and funding for fossil fuel related exports (Table 4-12). The Export Finance and Insurance Corporation (EFIC) provides "internationally competitive export finance facilities to Australian exporters with export contracts, where funding cannot be obtained

from privately owned financial institutions"(Commonwealth, 24 November 2003c, 22678). Between 1996 and 2002, EFIC had financed $4,6 billion worth of fossil fuel and fossil fuel technology exports while supporting $67,5 million

Table 4-12 Fossil Fuel and Renewable Energy Technology Exports supported by the Export Finance and Insurance Corporation (EFIC)

Year	Fossil fuel and fossil fuel technology exports ($m)	Renewable technology exports ($m)
1996	721,6	0
1997	760	60,26
1998	900	0
1999	773,1	7,2
2000	633,5	0
2001	327	0
2002	538,9	0
Total	**$4,654,1**	**$67,46**

Source: (Commonwealth, 24 November 2003c, 22678).

worth of renewable technology exports. Over the last 11 years total fossil fuel exports have been $7,6 billion. Whether or not the renewable energy industry have been proactive in seeking EFIC financial support, and if they did were they afforded an equal opportunity in receiving funding, is not known.

Where these fossil fuel exports have been aimed is also of concern. AID/Watch recently made the comment:

> While Environment Minister Kemp refuses to sign the Kyoto Protocol in large part because of the high carbon emissions from low income countries, our aid and trade programs are pushing fossil fuels to the same low income countries locking them into fossil fuel dependency for the next 50 years (Walsh, 2004, np).

While it has not been possible to corroborate this statement, the implications are significant and clearly it is an area of renewable energy policy development that needs attention.

4.2. Summary

The key issues influencing renewable energy policy and its technological implementation have been presented in this Chapter. Arguments on both sides of the debates are complex, and as a result of the very nature of climate change, debate has been controversial. It is significant that Australia is the world's largest per capita greenhouse

gas emitter, despite the fact that the country only contributes 1.4 per cent of total global emissions. To maintain credibility as a good global citizen Australia has to take responsibility for its emissions. This, the Commonwealth Government says, it is doing and repeatedly confirms that the country will fulfil its internationally agreed target by 2010-2012. The argument that the target of 108% was negotiated at too high a level in contrast to the majority of the developed world, and could have been met already if the Commonwealth Government was serious about land clearing, are issues that will remain unresolved.

Intuitively it has been known by Australians that "Australia is well placed to develop a world-class renewable energy industry, yielding benefits in jobs, regional development, economic growth, exports and, of course, the environment" (Commonwealth, 29 June 2000b, 18690, Kelvin Thomson). The establishment, therefore, of the mandatory renewable energy target and the sole legislative requirement to address greenhouse gas abatement, the *Renewable Energy Electricity Act 2000*, was heralded as a world first. MRET initiated investment in renewable energy sources that would otherwise not have been made. However, the legislation appears to be constrained. The renewable energy target is set at a political two per cent, or 9500 GWh, while in reality it affects to a less than one per cent target which is "insufficient to create internationally competitive renewable energy industries" (Saddler, Diesendorf & Denniss, 2004, 6).

The much touted $1 billion for Australia's greenhouse gas emissions response needs to be considered in terms of its focus and effectiveness of distribution. The closure of renewable energy CRCs and the expansion and extent of funding for fossil fuel related research and development further highlights the Commonwealth Government's priorities. As purportedly clean coal technologies, and carbon capture and storage takes precedence in national and international research and development it can be expected that renewable energy research and development will be relegated into the background. Faced with the prospect of an Australian / US free trade agreement that potentially could reduce the level of trade with non-agreement partners, the future contribution of Australia to renewable energy industry development in the Asia Pacific Region is questionable. When considered within an international context, not ratifying the Kyoto Protocol has additional implications for the renewable energy industry. The likelihood of being excluded from highly competitive and lucrative markets, and the opportunities provided through the

Protocol's flexibility mechanisms can be expected to severely restrict developments in Australia's fledgling renewable energy industries.

Identifying and analysing key Commonwealth political issues and debates that have impacted on the development of Australia's renewable energy policy fulfils research objective 3. Evaluating whether or not the Commonwealth is serious about developing the country's renewable energy resources is now the focus of Chapter 5.

5. Is Australia Serious about Developing the Country's Renewable Energy Resources?

5.1. Introduction

The aim of Chapter 5 is to consolidate and synthesise the key factors that have influenced renewable energy policy development in Australia to evaluate whether or not Australia is serious about developing its renewable energy resources as a response to climate change. Global initiatives that address the development of renewable energy alternatives to electricity generation are identified to highlight international trends that contrast with Australia's current circumstances.

5.2. Australia – An Early Adopter or Renegade?

Examining the development of renewable energy policy in Australia indicates that the country was an early adopter of global initiatives to stop human induced climate change. Australia became a signatory to the UNFCCC in 1992 and set up the NGS and the NSESD. The ERDC was established to investigate alternative renewable energy options and the voluntary Greenhouse Challenge encouraged industry to abate greenhouse gas emissions. In 1997, the Commonwealth Government took a leadership role by establishing the world's first government organisation specifically dealing with climate change, the AGO. The Government also committed funding and identified a broad band of measures to address greenhouse gas abatement including the establishment of a viable renewable energy industry (see Table 2-5).

However, despite early indications of support for greenhouse gas abatement and renewable energy initiatives there is considerable evidence of the Commonwealth Government's withdrawal of commitment from these activities. Of international importance was the Commonwealth Government's negotiating position at COP3 in Kyoto, Japan. The Howard Government signed, but would not ratify, the UN's Kyoto Protocol. The decision not to ratify was based on modelled scenarios, provided by ABARE and DFAT, which as discussed in Section 4.2.2 were considered to be significantly influenced by the fossil fuel industry and strongly biased. In addition, by

including the already decreasing emissions from land clearing into the setting of its 1990 base year emissions standard, Australia was considered, by some, of having secured an increase in allowable emissions through duplicitous means. Australia negotiated an emission target of 108% under the Kyoto Protocol which was in stark contrast to the majority of developed countries that reduced emissions by at least five per cent of 1990 emission levels.

The Commonwealth Government established another world first through the implementation of the *Renewable Energy (Electricity) Act 2000* and MRET, which introduced a mandatory target for electricity retailers to source an additional two per cent of electricity from renewable sources. However, the two per cent target was fixed at 9500 GWh and not linked to increases in electricity use. As such, the uptake of renewable energy into the electricity grid has fallen below two per cent to approximately 0.7 per cent. Despite the fact that since its implementation MRET has been shown to have contributed significantly to both the generation of renewable energy and to employment growth in regional Australia, the Howard Government has refused to increase the target to a true two per cent or higher.

In 2002, a COAG energy market review recommended MRET be stopped. This action undermined confidence in renewables investment and resulted in considerable economic insecurity regarding renewable energy developments, the effects of which are still experienced today. Both national and international investors have restrained their plans and commitments in the event that MRET is abandoned. Instead of alleviating concerns regarding MRET, and restoring investment certainty in their flagship greenhouse gas abatement measure, the Commonwealth Government waited for the MRET Review 2003, conducted two years after the *Renewable Energy (Electricity) Act 2000* came into force. The MRET Review 2003 supported the continuation of MRET, and recommended that the existing 9500 GWh target be maintained until 2012 when it should be increased to 20 000 GWh by 2020. Nine months after receiving the MRET Review 2003 the Howard Government has still made no comment on its recommendations. Permitting such delays, in the face of economic uncertainty surrounding a fledgling industry, illustrates the Commonwealth Government's lack of concern.

Budgetary underspending in key greenhouse related programs, as well as the reallocation of funds to coal related research and development away from renewable energy related initiatives, provides more evidence of the Commonwealth Government's retreat from renewable energy. The closure of the ERDC was significant. Australia now has "separate CRC's for black coal, brown coal, geosequestration and ecosystem sequestration yet none for renewable energy" (MacGill & Outhred, 2003, 14).

The lack of a national policy on energy is significant. Since coming to power in 1996, the Howard Government has repeatedly stated the importance of having a national energy policy. However, three years after the MCE was given the task of developing a National Energy Policy, Australia still does not have a national energy policy. Given the economic importance of energy it shows extraordinary complacency for the Commonwealth Government not to have this key policy in place. With no Commonwealth energy policy the opportunity for a proliferation of independent and non compatible state and federal policies and initiatives increases to the long term detriment of Australians and Australian business.

The Commonwealth Government's *laisser faire* approach can be attributed to a number of issues. With Australia being responsible for only 1.4 per cent of global greenhouse gas emissions, abatement measures could be considered to be of minor importance. A significant number of countries in the Asia Pacific region are developing countries and are not signatories to the UNFCCC. Australia as a signatory to the UNFCCC is part of the developed world, but by not ratifying the Kyoto Protocol the country can maintain its business relationships, competitiveness and not lose market share in the developing world. The market share is clearly large enough for Australia to accept the cost of compliance with its Kyoto target and not be concerned with potential penalties of being excluded as a non signatory. This apparent lack of concern could be a result of the alliance between the USA and Australia which continues to block international efforts to address climate change.

Coal as Australia's prime and medium term energy source is largely undisputed. As such, significant government support is provided to ensure that maximum productivity is achieved, and considerable research and funding is focused on clean coal technologies, carbon capture and storage. However, it has also been recognised by the IEA that the

renewable energy market is "on a fast-track upward trajectory" and will be "the fastest growing primary energy source over the coming two decades" (Koch, 2002, 674) The Australian renewables industry seized the opportunity provided by MRET and made a small but auspicious start. It is postulated that the powerful and influential fossil fuel and high energy industry lobby may have considered to have lost too much ground to the fledgling renewables industry and influence has been brought to bear on the Government to contain this development.

Historically, energy supply in fossil fuels has been considered secure, established and the foundation of the economy. Conversely, renewable energy alternatives have been considered unreliable, expensive and not able to produce the base load that Australian homes and industries require. This paradigm is now contradicted. For example, the Clean Energy Future Group, a coalition of renewable energy lobby groups has proposed an alternative scenario to cut greenhouse gas emissions by 2040 that significantly impacts on the fossil fuel industry. In the proposed scenario existing alternative technologies would be used to contribute to Australia's energy generation. Subsidies currently funding fossil fuel production and use, to an alleged sum of $5 billion per annum (Saddler, Diesendorf & Denniss, 2004, 150), would be reduced and allocated to ensure economic growth would not be affected. Coal power stations would be given a life span of 30 – 40 years after which they would be closed. Utilising the full range of alternative technologies, increasing energy efficiency and decreasing energy wastage is crucial to the success of the scenario. While this scenario might seem far fetched, researchers have pointed out "it is worth noting that oil met only 2 per cent of world energy demand in 1900; a level that wind energy is now close to meeting" (MacGill & Outhred, 2003, 15).

5.3. International Considerations

Internationally there appears to be little argument that the world faces a carbon-constrained future. Deep cuts in greenhouse gas emissions of up to 60 per cent this century will be required (Kemp, 2002a). Facilitating this process is a number of climate change related activities which will influence renewable energy development. Foremost in international processes is the Kyoto Protocol. Although considered by some to be a "paper tiger" with significant limitations, it seems clear that the Protocol is the most

advanced international agreement on climate change. In May 2004, Russia indicated that it would ratify the agreement which would bring the long awaited Protocol into effect. Irrespective of whether or not this happens, it can be expected that the UN will continue to work towards developing commitments beyond 2012 with more stringent targets and the involvement of developing countries in the process. Should Australia continue to refuse to be a ratified member in this UN driven process, the results could be significant. Exclusion from international competition and full participation in Kyoto and post Kyoto flexibility mechanisms are expected to severely restrict developments in Australia's fledgling renewable energy industries as well as issues of international significance.

> If Australia were one of a small number of countries who refused to ratify, it is likely that our ongoing interests in sensitive negotiations over security, trade, human rights, and other environmental issues would be seriously prejudiced. Australia also has important strategic interests in the Pacific region, where a number of nations are particularly vulnerable to the impacts of climate change.
>
> Furthermore, having been treated so generously in the Kyoto round, Australia is unlikely to achieve such an 'advantageous' result in any renegotiated agreement. The international community views with suspicion Australia's ability to inflate its 1990 emissions baseline through the inclusion of land use change, its generous 108 per cent target (compared with 95 per cent for most other Annex 1 countries), and its greater potential to utilise greenhouse sinks as an offset to fossil fuel emissions (The Senate Environment Communications Information Technology and the Arts References Committee, 2000, np).

The Minister of Environment and Heritage Dr. D. Kemp has stated that Australia is "actively working to put in place an effective global response to climate change that includes all major emitters" (Commonwealth, 6 November 2003, 22678, Hon. David Kemp). However, it is improbable that an entirely new and unilateral process could succeed, even with the support of the USA. It is considered to be important for Australia to be part of future UN negotiating and decision making processes as it is unlikely that they will be able to influence the process from the outside.

There are other international initiatives taking place that impact on renewable energy developments:

- The World Council for Renewable Energy (WCRE) has established a World Renewable Energy Agenda calling for the following:
  1. The establishment of an International Renewable Energy Agency (IRENA).

2. A Renewable Energy Proliferation Protocol be added to the Nuclear Non- Proliferation Treaty.
3. An international university for renewable resources.
4. A renewable energy priority in public and private finance.
5. Providing guidelines for effective implementation of sustainable project.
6. A fixed and increasing quota for renewable energy in developing aid budgets of industrial countries.
7. Global industrial norms and standards.
8. Complete emission measurements for the Clean Development Mechanism and emission trading of the Kyoto Protocol.
9. Suspension of trade barriers for renewable energy technologies and efficiency technologies.
10. Integrated strategies for UN-Organizations (World Council for Renewable Energy, 2003, 8-11).

- Member Governments of the IEA will continue to be requested to affirm:
  - that renewable energy should play an increasing role in the mix of fuels;
  - the importance of examining strategies and employing market mechanisms to improve the competitiveness of renewable energies; and
  - that countries should address barriers to renewable energy development, promote technical standards, and reduce regulatory impediments to renewable energy trade and investment (IEA Information Centre, 2004, np).

- In April 2004, an Asia Pacific Renewable Energy Agenda 2004 was drafted calling for a "comprehensive regional policy framework on renewable energy" (World Council for Renewable Energy, 2004, 2). The risk from sea level rise is considerable for many island and coastal countries and for too long has been ignored.

- In June 2004 the International Conference for Renewable Energies – Renewables 2004 was held in Bonn, Germany. Participants from 154 countries acknowledged a number of key issues including:
  - renewable energy, combined with enhanced energy efficiency, can contribute significantly to sustainable development and to providing access to energy;
  - the important role of renewables in mitigating greenhouse gas emissions, reducing harmful air pollutants and creating new economic opportunities;
  - commitment to increase substantially the global share of renewable energy in total energy supply, and to do so with a sense of urgency (International Institute for Sustainable Development, 2004, np).

An International Action Programme of 194 actions and commitments has been identified, the progress of which will be monitored by the Commission on Sustainable Development. It should be noted that Australia's commitment at the conference to promote renewable energy developments was MRET (Secretariat of the International Conference for Renewable Energies, 2004, 2).

- Emissions trading in Europe will start in 2005 incorporating 46 per cent of emissions.

- In the USA efforts are underway to introduce an emissions trading and carbon capping scheme. In addition, the election of a Democrat as President in late 2004 could signify a return of the USA to international climate change commitments.

The impression gained from these initiatives is that internationally renewable energy developments have just started to gain momentum. In comparison Australia has lost both momentum in developments and influence in international processes.

5.4. Conclusion

Climate change is a long-term challenge, the implications and impacts of which conflict with short term, political agendas. With so called "deep cuts", upwards of 60 per cent reduction in greenhouse gas emissions, being required this century it is inevitable that Australian life style will be affected. Measures to mitigate and ameliorate impacts, including the establishment of renewable energy alternatives to fossil fuel electricity generation, are essential. In Europe, where ambitious targets for the incorporation of renewable energy into their energy mix have been made, "the role of the public authorities is quite specific: to stimulate technical progress and speed up the technological learning processes so that ultimately renewable energy technologies will be able to compete with conventional technologies, once the environmental costs have been internalised" (Menanteau, Finon & Lamy, 2003, 799). It is clear that the Commonwealth Government should take the lead in long term planning and goal setting. A principle established by COAG supports long term planning:

> Efficient energy markets and an effective policy framework are needed to reduce investment uncertainty, facilitate infrastructure development, encourage the development and uptake of alternative, environmentally friendly energy services and facilitate more efficient use of energy throughout the economy (COAG, 2001, np).

While the Howard Government has initiated measures to facilitate greenhouse gas abatement, including the implementation of the *Renewable Energy (Electricity) Act 2000,* it has not implemented the level of international or national policies and practices that are required to encourage increased investment and provide the opportunity for renewable energy industries to grow. The Commonwealth Government has not provided sufficient incentive, support and time for the renewable industry to compete with conventional technologies, once the environmental costs of electricity generation have been internalised by all technologies concerned. Therefore, in conclusion, it is considered that Australia does not have a renewable energy policy and is not serious about developing its renewable energy resources under current political circumstances.

The end of renewable energy development in Australia is, however, not in sight. Environmentally renewable resources are plentiful and will not remain untapped. Politically, the Labor Party has categorically stated the following:

> A Labor Government would tackle the problem of climate change. We would ratify the Kyoto Protocol, establish and internationally recognised trading scheme, lift the mandatory renewable energy target to an additional 5% by Year 2010, and make sure that money committed to greenhouse programs is spent, is spent properly, and gives tax payers value for money, and the environment the emission reductions it needs (Commonwealth, 9 March 2004, 26284, Kelvin Thomson).

Should the Labor Party come to power in Australia, and should it hold true to the policies outlined above, renewable energy alternatives to electricity supply are likely to be encouraged and Australia potentially will take greater responsibility regarding greenhouse gas abatement. This is the challenge for tomorrow.

5.5. Postscript

On 15 June 2004 Prime Minister Howard presented the Commonwealth Government's white paper *Securing Australia's Energy Future*. This long awaited response to the Parer Review and the MRET Review 2003 sets out a range of initiatives (Table 5-1) offering

"much more than a mandatory safety net for renewables – it provides a launch pad to a new era of development" (Kemp, 2004, np).

Table 5-1 Measures Announced to Encourage Renewable Energy Developments by Prime Minister John Howard in His Speech Entitled *Securing Australia's Energy Future,* 2004.

Measure	Funding Committed ($million)
Low Emissions Technology Fund	500
Renewable Energy Development	100
Solar Cities Trial	75
Advanced Electricity Storage Technologies	20
Wind Forecasting Capability	14

Source: (Commonwealth of Australia, 2004).

While maintaining funding for existing renewable energy programs such RRPGP, the Government also maintained its position not to increase MRET's 9500 GWh target or extend the time frame of the measure. The Government stated that it will improve "transparency and administration"(Commonwealth of Australia, 2004, 26) of MRET and that it believes:

> ... that the time has come to target support for renewable energy by addressing technical and regulatory barriers to its widespread take-up rather than raising the general industry subsidies implicit in MRET - $5 billion by 2020 at the 20,000 GWh level proposed by the Tambling Panel, and $11 billion by 2020 at Labor's proposed level (Kemp, 2004, np).

A new Low Emissions Technology and Abatement Program (LETA) will be established and is considered as a potential opportunity for renewable energy technologies and industry development projects (Smedley, 2004). $26,9 million over four years will facilitate "the development, demonstration and deployment of smaller scale low emission technologies, and other cost-effective abatement activities" (Commonwealth of Australia, 2004, 183). In strong contrast $500 million over four years has been committed to a Low Emissions Technology Demonstration Fund that will be established "to support industry-led projects for large-scale demonstration of low emissions technologies that could reduce the cost of technologies with significant long-term abatement potential" (Commonwealth of Australia, 2004, 182). This funding is specifically targeted at fossil fuel greenhouse gas abatement and Hot Dry Rock technologies.

Reaction to the Government's white paper has been swift. Mr R. Brazzale, Executive Director of the BCSE stated that:

> Without an increase in MRET there is no strategic framework for growing renewables in Australia. The emerging domestic industry will stall as a result (Australian Business Council for Sustainable Energy, 2004, np).

The Editor of *The Mercury* newspaper captured reactions with the following statement:

> Australia now cuts a peculiar figure on the international stage as a wealthy country that is going against a global trend by actively discouraging investment in renewable energy (Bailey, 2004, 16).

Without the benefit of in depth analysis of the 2004 White Paper it is apparent that the recommendations of the MRET Review 2003 have not been accepted. Not only does the White Paper not increase support for the renewables energy industry, by removal of the excise on diesel fuel it encourages fuel use, thereby increasing greenhouse gas emissions. No new targets have been established for greenhouse gas emissions.

It is posited the Howard Government has reinforced the message that renewable energy developments will be continued at a minimum level, and ultimately will not fulfil the objectives of the *Renewable Energy (Electricity) Act 2000*. Renewable energy generation in Australia will increase to a maximum of 9500 GWh and greenhouse gas emissions will be minimally reduced. However, development of commercially competitive renewable energy, and internationally, competitive renewable energy industries which could participate effectively in the burgeoning Asian and international energy markets, are unlikely under current circumstances. Australia instead will focus on developing and exporting clean coal, carbon capture and related technologies.

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Appendix 1

COMMONWEALTH OF AUSTRALIA
HANSARD GUIDE TO
THE RENEWABLE ENERGY (ELECTRICITY) ACT 2000, CLIMATE CHANGE AND GREENHOUSE
KEY DATES FROM 1997 TO 2003

COMMONWEALTH OF AUSTRALIA
HANSARD GUIDE TO
THE RENEWABLE ENERGY (ELECTRICITY) ACT 2000, CLIMATE CHANGE AND GREENHOUSE
Key Dates from 1997 to 2003 for the House of Representatives and the Senate

Web site: http://www.aph.gov.au/hansard/index.htm

Key words: Renewable Energy, Greenhouse, Climate Change

House of Representatives

Month	Dates when the House of Representatives sat	Dates when key issues were discussed	Title, Page Number	Main Speakers
Feb 1997	4,5,6,10,11,12, 13,24,25,26,27	None		
March 1997	3,4,5,6,18,19,20,24,25, 26	5	Greenhouse Gas Emissions, (2026)	Jeanes, Downer
		15	Matters of Public Importance – Lucas Heights Nuclear Reactor (2458)	Campbell, Gash, Latham, Lawrence, McGauran
Apr 1997	Not sitting			
May 1997	13,14,15,26,27 ,28,29	27	Climate Change: Greenhouse Gas Emissions Against Aus interests to support climate change negotiations (4100)	De-Anne Kelly, Downer
		27	Natural Heritage Trust Bill 1996 reduction in funding for energy research and development (4165)	Kerr, O'Keefe
June 1997	2,3,4,5,16,17,18,19,23,24,25, 26,27	3	Parer abolished the Energy Research and Development Corporation and slashed energy efficiency budget (4717)	Thomson
		4	Greenhouse emissions briefly (5009)	Nelson
		5	Climate change (5094)	Smith
		17	Climate change (5494) Climate change (5495)	Jenkins Fischer
		18	Greenhouse (5676)	Campbell
		19	Earth summit (5842)	Evans, Fisher
		23	Greenhouse Gas Emissions (5985)	Bartlett, Warwick Smith
		25	Greenhouse Gas Emissions (6258)	Marek, Fischer
		26	Greenhouse Gas Emissions (6434)	Broadbent, Anderson
July 1997	Not sitting			
Aug 1997	25,26,27,28	25	Economic rationalisation (6743)	Jenkins
		27	Aus/UK position on Climate Change.	Howard Beazley

Month	Dates when the House of Representatives sat	Dates when key issues were discussed	Title, Page Number	Main Speakers
Sept 1997	1,2,3,4,22,23,24,25,29,30	22	Greenhouse gases (8000) Young people (8036) Greenhouse Science Advisory Committee (8109) Greenhouse Gas Research (8142)	Cameron, Howard Jones, Anderson
		23	Greenhouse gases (8160- 8163) IPCC (8160) ERDC (8161) EU (8161)	Neville, McGauran, Kerr. Smith, Howard, Kerr. Lloyd, Downer
		24	Greenhouse gases (8396) Excise Tariff Bill (8410)	Jenkins Willis
		29	Greenhouse gases (8673)	Barresi
Oct 1997	1,2,20,21,22,23,27,28,29,30	1	Greenhouse gases (8904)	Gallus, Howard
		20	Greenhouse gases (9200) Car emissions (9237)	Billson, Howard McClelland
Nov 1997	17,18,19,20,24,25,26,27	17	Greenhouse gases (10467)	Kerr, Howard
		17	Greenhouse gases (10497)	Willis
		18	Greenhouse Gases (10642)	Beazley, Downer, Kerr
		19	CHOGM (10782)	Howard, Beazley
		20	Safeguarding the Future Australia's Response to Climate Change (10921)	Howard, Beazley
		20	Greenhouse Gases (10941/10942)	Andrew, Howard, Beazley
		20	Safeguarding the Future Australia's Response to Climate Change (10985)	Charles
		24	Greenhouse Gases (11070)	Kerr, Tuckey,Fischer
		24	Greenhouse Climate Change: Health Studies	Kerr, Wooldridge
		26	Appropriations (Parliamentary Departments) Bill No. 2 1997-98 (11299)	Hollis
		26	Appropriations (Parliamentary Departments) Bill No. 2 1997-98 (11306)	Anderson
		26	Greenhouse Gases (11324)	Dondas, Anderson
Dec 1997	1,2,3,4,5,6	1	Greenhouse Gases (11654)	Crosio
			Ministerial Roundtable on Sustainable Energy (12022)	Lawrence, Anderson
Feb 1998	Not sitting			
Mar 1998	2,3,4,5,9,10,11,12,23,24,25,26,30,31	2	Greenhouse Gas Emission Targets Q2441 (149)	Wilton, Howard
		9	Greenhouse Gases (749)	Macklin
		11	Greenhouse Gas Emissions (992)	Billson, Downer
		12	Prime Minister Motion of Censure (1175)	Beazley, Howard, Crean, Costello
			Energy Research and Development Corporation (1945)	Campbell, Anderson

Month	Dates when the House of Representatives sat	Dates when key issues were discussed	Title, Page Number	Main Speakers
Apr 1998	1,2,6,7,8,9		None	
May 1998	12,13,14,25,26,27,28	14	Australian Radiation Protection and Nuclear Safety Bill (3477)	Cobb
June 1998	1,2,3,4,22,23,24,25,29,30	2	Appropriation Bill No.1 1998-99 Second Reading (4497) (4540)	Barry Jones Jenkins, Charles
July 1998	1,2,3,15	15	Employment (6204)	Ferguson, Fischer
Aug 1998	Not sitting			
Sept 1998	Not sitting			
Oct 1998	Not sitting			
Nov 1998	10,11,12,23,24,25,26,30	23	Alternative Energy Sources (412)	Charles
Dec 1998	1,2,3,7,8,9,10	None		
Feb 1999	8,9,10,11,15,16,17,18	None		
Mar 1999	8,9,10,11,22,23,24,25,29,30,31	None		
Apr 1999	Not sitting			
May 1999	11,12,13,31	None		
June 1999	1,2,3,7,8,9,10,21,22,23,24,28,29,30	None		
July 1999	Not sitting			
Aug 1999	9,10,11,12,23,24,25,26,30,31	26	Appropriation (Supplementary Measures) Bill (No. 2) 1999 (9173)	Slipper
		26	Petroleum (Submerged Lands) Legislation Amendment Bill 1999 Second Reading (9277)	Evans
Sep 1999	1,2,20,21,22,23,27,28,29,30	None		
Oct 1999	11,12,13,14,18,19,20,21	None		
Nov 1999	22,23,24,25	None		
Dec 1999	6,7,8,9	None		
Feb 2000	15,16,17	None		
Mar 2000	6,7,8,9,13,14,15,16	None		
Apr 2000	3,4,5,6,10,11,12,13	None		
May 2000	9,10,11,29,30,31	11	Environment and Heritage Legislation Amendment Bill 2000(16300)	Hoare
June 2000	1,5,6,7,8,19,20,21,22,26,27,28,29	22	Renewable Energy (Electricity) Bill 2000 First and Second Reading (18030).	Stone
		29	Third Reading (18681)	Evans, Washer, Thomson, Haase, Hall, Katter, Sidebottom, Kelly, Jenkins, Andren, Stone, Evans, Stone

Month	Dates when the House of Representatives sat	Dates when key issues were discussed	Title, Page Number	Main Speakers
July 2000	Not sitting			
Aug 2000	14,15,16,17,28,29,30,31	None		
Sep 2000	4,5,6,7	None		
Oct 2000	3,4,5,9,10,11,12,30,31	9	Bill returned from Senate (21119)	
Nov 2000	1,2,6,7,8,9,27,28,29,30	None		
Dec 2000	4,5,6,7	7	Consideration of Senate message (23785)	
Feb 2001	6,7,8,26,27,28	6	Governor General assents to the Bill (23909)	
Mar 2001	1,5,6,7,8,26,27,28,29	None		
April 2001	2,3,4,5	None		
May 2001	9,10,22,23,24	None		
June 2001	4,5,6,7,18,19,20,21,25,26,27,28	None		
July 2001	Not sitting			
Aug 2001	6,7,8,9,20,21,22,23,27,28,29,30	None		
Sep 2001	17,18,19,20,24,25,26,27	24	Brief overview of Government's activities in response to questions (31345)	Murphy, Truss
Oct 2001	Not sitting			
Nov 2001	Not sitting			
Dec 2001	Not sitting			
Feb 2002	12,13,14,18,19,20,21	None		
Mar 2002	11,12,13,14,19,20,21	19	Environment: Greenhouse Gas Emissions (1541)	Jenkins
Apr 2002	Not sitting			
May 2002	14,15,16,27,28,29,30	29	Diesel Fuel Rebate Scheme Amendment Bill 2002 (2597)	Slipper
June 2002	3,4,5,6,17,18,19,20,24,25,26,27	25	Questions regarding Environment: Renewable Energy (4296)	Hawker, Kemp
		26	Notice to present an amendment to the Act	Kemp
		27	First reading of Renewable Energy (Electricity) Amendment Bill (2002) (4548)	Kemp
Aug 2002	19,20,21,22,26,27,28,29	19	Environment: Greenhouse Gas Emissions (4987)	Burke, Kemp
		19	Environment: Renewable Energy (5144)	Fitzgibbon, Kemp
		20	Discussion on Climate Change (5208)	Thomson, Kemp, Billson, Livermore
Sep 2002	16,17,18,19,23,24,25,26	None		

Month	Dates when the House of Representatives sat	Dates when key issues were discussed	Title, Page Number	Main Speakers
Oct 2002	14,15,16,17,21 ,22,23,24	None		
Nov 2002	11,12,13,14	None		
Dec 2002	2,3,4,5,9,10,11 ,12	11	Second Reading of the Renewable Energy (Electricity) Amendment Bill 2002 (10218-10246)	Hunt, Hall, De-Anne Kelly, Jenkins, Haase, Murphy, Livermore, Emerson, Hatton
		12	Third Reading of Amendment Bill (10284) and consideration of Senate message (10505) Second Reading (10577 -10589)	Snowdon, Adam, King, Stone
Feb 2003	4,5,6,10,11,12, 13	4	Kyoto Protocol and Australian Greenhouse Office (10882-10884)	Emerson, Macfarlane
Mar 2003	3,4,5,6,18,19,2 0,24,25,26,27	6	Environment: Alternative Energy (12424)	Neville, Kemp
Apr 2003	Not sitting			
May 2003	13,14,15,26,27 ,28,29	26	Solar power (14969)	Murphy
June 2003	2,3,4,5,16,17,1 8,19,23,24,25, 26	5	Question without Notice: Environment: Renewable Energy (15518-15519)	Crean, Howard
		16	Labor Environmental Policy (15714-15716)	Thomson
		17	Appropriation Bill (No.1) Labor Environmental Policy (15805)	Thomson
		23	Product Stewardship Legislation Amendment Bill (No.1) Second Reading (16193)	Thomson
July 2003	Not sitting			
Aug 2003	11,12,13,14,18 ,19,20,21	11	Environment and Heritage: Program Funding (18031)	Hoare, Kemp
		11	Appointment of Grant Tambling to MRET review (18046)	Thomson, Kemp
Sep 2003	8,9,10,11,15,1 6,17,18	10	Sustainable transport	Gambaro
		11	Commendation of the Energy Grants (Cleaner Fuels) Scheme Bill 2003 and the companion Bill Energy Grants (Cleaner Fuels) Scheme (Consequential Amendments) 2003.	Slipper
		17	Labor support for MRET (20283)	FitzGibbon
		18	Environment: Greenhouse Gas Emissions (19683)	Elson. Kemp
Oct 2003	7,8,9,13,14,15, 16,23,24	7	Environment: Greenhouse Gas Emissions (20700)	Evans, Kemp
Nov 2003	3,4,5,6,24,25,2 6,27	3	Second Reading of the Ozone Protection and Synthetic Greenhouse Gas Legislation Amendment Bill 2003 Cognate Bills: Ozone Protection (Licence Fees—Imports) Amendment Bill 2003 Ozone Protection (Licence Fees—Manufacture) Amendment Bill 2003	Thomson, Washer, Organ, Lloyd, Hatton, Hunt, Evans

Month	Dates when the House of Representatives sat	Dates when key issues were discussed	Title, Page Number	Main Speakers
		4	Second Reading of the Ozone Protection and Synthetic Greenhouse Gas Legislation Amendment Bill 2003 Cognate Bills: Ozone Protection (Licence Fees—Imports) Amendment Bill 2003 Ozone Protection (Licence Fees—Manufacture) Amendment Bill 2003	Evans, Charles, Crosio, Murphy, King, Smith, Burke, Zahra, Wilkie, Katter, Stone,
		6	Notice on amendment to the Renewable Energy Act (2000) - Local Community Input into Renewable Energy Developments Bill 2003) (22149)	Zahra
		6	Greenhouse Gas Emissions. Climate Change Forward Strategy, and the Business Climate Change Dialogue working groups (22181)	Thomson, Kemp
		7	Environment: Greenhouse Gas Emissions (20700))	Evans, Kemp
		24	Fossil Fuel Financial Support (22678)	Thomson, Kemp
		24	Wind Energy (22601)	Thomson, Kemp
		24	Greenhouse Challenge (22603)	Thomson, Kemp
		25	Local Community Input into Renewable Energy Developments Bill 2003 (22632)	Zahra
			Environment: Solar Power (22724)	Thomson, Kemp
Dec 2003	1,2,3,4	1	Environment and Heritage Committee Report Heritage	Billson, George
		1	Local Community Input into Renewable Energy Developments Bill 2003—First Reading .23020	Zahra
		2	Environment: Kyoto Protocol (23090)	Latham, Howard
		3	Environment: Kyoto Protocol (23270)	Washer

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THE RENEWABLE ENERGY (ELECTRICITY) ACT 2000, CLIMATE CHANGE AND GREENHOUSE
KEY DATES FROM 1997 TO 2003

Senate

Month	Dates when Senate sat	Dates when key issues were discussed	Title, Page Number	Main Speakers
Feb 1997	4,5,6,10,11, 12,13,24,25, 26,27	25	Greenhouse Gases (902)	Lees, Hill
Mar 1997	3,4,5,6,17,1 8,19,20,21,2 4, 25,26	3	Clean Up Australia (1069)	MacGibbon, Hill
		6	Income Tax (Transitional Provisions) Bill 1996 (1428) (Mining tax)	Cook, Margetts
		18	Greenhouse Gases (1646)	Patterson, Parer
		19	Mining (1827)	Margetts
		21	Ethanol (2188)	Childs
Apr 1998				
May 1997	6,7,12,13,14 ,15,26,27,28 ,29,30	6	Greenhouse Gases (2663)	Lees, Hill
		15	Budget 1997-98 (3503)	Kernot
		26	The Customs and Excise Legislation Amendment Bill (No. 2) 1996 (No. 2) (3593)	Margetts
		28	The Customs and Excise Legislation Amendment Bill (No. 2) 1996 (No. 2) (3834)	Margetts, Brown, Parer, Cook, Harradine
		28	Australian Bureau of Agricultural and Resource Economics (3934)	Brown, Parer
		29	Energy Research and Development Corporation (3940) Greenhouse Gas Emissions (3940)	Stott Despoja Lees
June 1997	16,17,18,19, 20,23,24,25, 26,27	16	United Nations General Assembly Special Session (4182)	Lees, Hill
		17	Environment: Greenhouse Gases (4312)	Ferris, Hill
		17	Environment (4312)	Brown, Hill
		17	Earth Summit (4336)	Margetts for Brown
		18	Greenhouse Gases (4490)	Lees, Hill
		19	Electricity generation (4639)	Margetts, Parer
		23	Environment (4848)	Brown, Parer
		23	Greenhouse Gas (4866)	Woodley
		23	Greenhouse Gas (4866)	Stott Despoja
		23	Greenhouse Gas (4867)	Bourne
		24	Environment (4960)	Lees, Parer
		24	Environment (4962)	Chapman, Parer
		24	Greenhouse Gas (4975)	Lees
		24	Greenhouse Gas (4975	Murray

Month	Dates when Senate sat	Dates when key issues were discussed	Title, Page Number	Main Speakers
		24	Environment (4962)	Chapman, Parer
		24	Greenhouse Gas (4975)	Murray
		24	Appropriation Bill (No. 1) 1997-98 (5008)	Brown
		25	Sun Fund Bill 1997 (5146) First and Second Reading	Brown
		26	Greenhouse Gas (5266)	Lees
		26	Greenhouse Gas (5327)	Lees Parer
		26	Greenhouse Gas (5355)	Lees, Parer
		27	Environment—Greenhouse Gas Emissions (5519)	
July 1997	Not sitting			
Aug 1997	25,26,27,28	26	Greenhouse Gas Emissions (5666)	Lees, Hill
		27	Ministerial Statements Visit by the Prime Minister to the United Kingdom and the United States of America (5837)	Minchin for Howard
		27	Ministerial Statements Visit by the Prime Minister to the United Kingdom and the United States of America (5842)	Cook
Sept 1997	1,2,3,4,22,23,24,25,29,30	3	Greenhouse Gases (6287)	Knowles, Hill
		22	Greenhouse Gases (6581)	Lees, Hill, Faulkner, Heffernan, Brown, Macdonald
		23	Greenhouse Gases (6709)	Heffernan, Hill
		23	Greenhouse Gases (6714)	Lees
		23	Greenhouse Gases (6738)	Brown
		23	Greenhouse Gases (6739)	Brown
		24	Greenhouse Gases (6873)	Evans
		25	Greenhouse Gases (6992)	Abetz, Parer
Oct 1997	1,2,20,21,22,23,27,28,29,30	1	Matters of Public Interest (7311)	Lees
		27	Question on Notice: Energy Research and Development Corporation (8191)	Brown, Parer
		30	Questions without Notice: Greenhouse Gases (8463)	MacDonald, Parer
Nov 1997	10,11,17,18,19,24,25,26,27,28	17	Mining Industry: Employment (8847)	Lees, Parer
		18	Wind Generated Energy: Breamlea, Victoria (9051)	Allison
		18	Greenhouse Gases (8954)	Lees, Parer
		19	Prime Minister's Attendance at CHOGMand Visit to Indonesia (9144)	Minchin for Howard
		24	Greenhouse Gases (9223)	O'Chee, Hill
		24	Greenhouse Gases (9243)	Brown
		24	Tabled a statement by the Prime Minister entitled Safeguarding the future: Australia's response to climate change (9253-9264)	Campbell
		26	Greenhouse Gases (9495)	Lees / Hill

Month	Dates when Senate sat	Dates when key issues were discussed	Title, Page Number	Main Speakers
		27	Greenhouse Gases (9653)	Brown/ Hill
		27	Greenhouse Gases (9675)	Brown
Dec 1997	1,2,3,4,5	1	Greenhouse Gases (9877)	Allison
		4	Energy Research and Development Corporation (10635)	Brown, Parer
		5 (incorrectly given as 4th)	Greenhouse Gases 10635	Brown, Hill
Feb 1998	Not sitting			
Mar 1998	2,3,4,5,9,10, 11,12,23,24, 25,26,30,31	2	Kyoto: Climate Change Convention	Margetts
		3	Kyoto: Climate Change Convention	Calvert, Hill
		12	Minister for Resources and Energy (948)	Lees, Parer,
		12	Minister for Resources and Energy (949)	Evans, Parer
		23	Minister for Resources and Energy	Lees
		25	Energy Research And Development Corporation Regulations (1328)	Parer, Lees, Brown
		26	Privilege 1354	Brown
Apr 1998	1,2,3,6,7,8	2	Minister for Resources and Energy (1824)	Allison
		6	Renewable Energy (2049)	MacDonald, Parer
		8	OECD Environment Performance (2407)	Brownhill
May 1998	12,13,14,25, 26,27,28,29	14	Budget 1998-99 (2906)	Lees
		27	Export Finance Investment Corporation 3295	Brown, Parer
		28	Greenhouse Gas Emissions (3366)	Evans, Parer
June 1998	22,23,24,25, 26,29,30	22	Power Supplies: Victoria (3607)	Allison
		22	Greenhouse Gases 3737	Brown, Hill
		23	Foreign Affairs, Defence and Trade Committee: Joint CHOGM (3821)	Troeth Downer
		30	Electricity Industry: Privatisation (4431)	Margetts
July 1998	1,2,3,6,7,8,9 ,10,11	1	Sustainable Energy (4602)	Allison
		2	Rural and Regional Affairs and Transport Legislation Committee Report: Government Response (4764)	Herron
Aug 1998	Not sitting			
Sep 1998	Not sitting			
Oct 1998	Not sitting			
Nov 1998	10,11,12,23, 24,25,26,30	11	Greenhouse Gases (116)	Allison, Minchin
		24	Greenhouse Gases (506)	Allison
		26	Greenhouse Gases (764)	Calvert, Hill
Dec 1998	1,2,3,7,8,9,1 0	2	National Environment Protection Measures (Implementation) Bill 1998(1146)	Hill
Feb 1999	15,16,17,18	17	Renewable Energy (2084)	Parer, Minchin
		18	Renewable Energy Sources (2295)	Brown, Hill
		18	Renewable Energy Research (2296)	Brown, Hill

Month	Dates when Senate sat	Dates when key issues were discussed	Title, Page Number	Main Speakers
		18	Emissions Inventories (2286) (forest)	Brown, Hill
Mar 1999	8,9,10,11,22 ,23,24,25,29 ,30,31	31	Appropriation (Parliamentary Departments) Bill (No. 2) 1998-99 Appropriation Bill (No. 3) 1998-99 Appropriation Bill (No. 4) 1998-99 (3551) Second Reading	Brown
Apr 1999	19,20,21,22, 23,27,28,29, 30	20	A New Tax System (Goods and Services Tax) Bill 1998 (3819)	Allison
		21	Proposed Amendment to A New Tax System (Goods and Services Tax) Bill 1998 (3996)	Margetts, Brown
May 1999	11,12,13,14, 24,25,26,27	11	Climate Change Convention: Carbon Credits (4802)	Brown
		26	Renewable Energy (5452)	Watson, Minchin
June 1999	21,22,23,24, 25,28,29,30	21	Auditor-General's Reports Report No. 47 of 1998-99 (5736)	Margetts
		25	Greenhouse Gas Inventory and National Carbon Accounting System (6550)	Brown
		28	Goods and Services Tax: Environmental Impact (6584)	McGauran, Minchin
		29	Diesel and Alternative Fuels Grants Scheme Bill 1999 and the Customs and Excise Amendment (Diesel Fuel Rebate Scheme) Bill 1999 (6789)	Margetts
July 1999	Not sitting			
Aug 1999	9,10,11,12,2 3,24,25,26,3 0,31	11	Issues referred to the Environment, Communications, Information Technology and the Arts References Committee (7292)	Allison
Sept 1999	1,2,20,21,22 ,23,27,28,29 ,30	1	Regional Forest Agreements Bill 1998 (8087)	Brown
		2	Convention On Climate Change Implementation Bill 1999 First and Second Reading (8194)	Brown
		29	Appropriation (Supplementary Measures) Bill (No. 2) 1999 (9187)	
Oct 1999	11,12,13,14, 18,19,20,21	11	Appropriation (Supplementary Measures) Bill (No. 2) 1999	
		12	Queensland Clearing of Native Vegetation (9442)	Hill, Bartlett
		21	Alternative Energy Sources: Research Funding (10244)	O'Brien, Minchin
Nov 1999	22,23,24,25, 26,29,30	22	Electricity: Renewable Sources (10281)	Bolkus, Hill
		23	Environment: Kyoto Protocol (10385)	Bolkus, Hill
		30	Queensland: Clearing Of Native Vegetation (11054)	Brown
Dec 1999	6,7,8,9	None		
Feb 2000	15,16,17	None		
Mar 2000	6,7,8,9,13,1 4,15,16	6	Draft legislation to be drawn up (12242)	
		15	Question on hydro electricity dams (12922)	Brown

Month	Dates when Senate sat	Dates when key issues were discussed	Title, Page Number	Main Speakers
Apr 2000	3,4,5,6,10,11,12,13	None		
May 2000	9,10,11	None		
June 2000	5,6,7,8,19,20,21,22,26,27,28,29	28	Referral of the Bill to ECITA (15864)	
July 2000	13	13	ECITA Debate	
Aug 2000	14,15,16,17, 28,29,30,31	14	First reading in the Senate (16238).	Campbell
		15	Report received from ECITA (16391)	Allison
		28	Second reading (16740)	Forshaw, Brown, Murphy, O'Brien, Allison, McLucas, Sherry,
Sep 2000	4,5,6,7	None		
Oct 2000	3,4,5,9,10,11,12,30,31	3	Continuation of Second Reading (17719-17736)	Campbell, Brown, Bolkus, Murphy, Allison,
		4	Continuation of debate (17773-17811)	Brown, Campbell
		9	Third reading (18108)	
		10	Consideration of House of Reps message (18205)	Brown, Bolkus, Hill, Allison
		11	Consideration of House of Reps message (18246)	Brown, Bolkus, Hill, Allison
		30	Debate postponed (18561)	
Nov 2000	1,2,6,7,8,9,10,27,28,29,30	None		
Dec 2000	1,4,5,6,7	7	Debate resumed (21161,21182)	Brown, Bolkus, Hill, Allison
		7	Renewable Energy Electricity) (Charge) Amendment Bill 2000 First Reading (21198) Bill returned from Reps (21242)	Hill, Bolkus, Brown
Feb 2001	6,7,8,26,27, 28	6	House of Reps agrees to Senate Amendments (21377)	
Mar 2001	1,5,6,7,8,26, 27,28,29	1	Discussion on Greenhouse Gas Emissions (22332)	Bolkus, Hill
		27	Renewable Energy Regulations Disallowance Motions (23112)	Brown, Allison, Bolkus, Hill, O'Brien,
Apr 2001	2,3,4,5	2	Brief on statutory rules (23452)	
May 2001	9,10,22,23,24	24	Letters - statutory rules (24261)	
June 2001	18,19,20,21, 25,26,27,28	19	Discussion on global warming (24603) (24610)	Brown, Hill, Bolkus, Hill, Ludwig, Eggleston

Month	Dates when Senate sat	Dates when key issues were discussed	Title, Page Number	Main Speakers
		26	Discussion on renewable energy (25150)	Lightfoot
		27	Questions on the legislation (25219,25231)	Allison, Hill
July 2001	Not sitting			
Aug 2001	6,7,8,9,20,21,22,23,27,28,29,30	23	Government Response To The Senate Environment, Communications, Information Technology And The Arts References Committee Report: The Heat Is On: Australia's Greenhouse Future, (26523)	
Sep 2001	17,18,19,20, 24,25,26,27	None		
Oct 2001	Not sitting			
Nov 2001	Not sitting			
Dec 2001	Not sitting			
Feb 2002	12,13,14	None		
Mar 2002	11,12,13,14, 19,20,21	None		
Apr 2002	Not sitting			
May 2002	14,15,16	14	Renewable Energy Certificates (1468)	Allison, Hill
June 2002	17,18,19,20, 24,25,26,27	None		
July 2002	Not sitting			
Aug 2002	19,20,21,22, 26,27,28,29	20	First annual report of the office of the Renewable Energy Regulator (3365)	Bartlett
		22	Environmental Priorities (3646)	Brown, Hill
		27	Environment: Sustainable Development (3776)	Allison Hill
Sep 2002	16,17,18,19, 23,24,25,26	25	Environment: Climate Change (4944)	Brown, Hill
Oct 2002	14,15,16,17, 21,22,23,24	23	Environment: Renewable Energy (5723,5731)	Allison, Hill, Brown
Nov 2002	11,12,13,14, 15,18,19	19	Environment: Greenhouse Gas Emissions (6718-6719, 6735)	Allison, Hill
Dec 2002	2,3,4,5,9,10, 11,12	9	Presentation of Renewable Energy (Electricity) Amendment Bill 2002 (7406)	
		12	First and Second Reading of the Renewable Energy (Electricity) Amendment Bill 2002 (8039 - 8086)	Alston, Brown Mackay, O'Brien, Allison, Macdonald
Feb 2003	4,5,6	None		
Mar 2003	3,4,5,6,18,19,20,24,25,26,27	19 Mar 2003	Industry, Tourism and Resources: Energy Policy. (9808-9813)	Brown, Minchin
		20 March 2003	Notice to the Senate (9815)	Allison
		25 March 2003	Motion (10087)	Allison
Apr 2003	Not sitting			
May 2003	13,14,15	None		

Month	Dates when Senate sat	Dates when key issues were discussed	Title, Page Number	Main Speakers
June 2003	16,17,18,19, 23,24,25,26	23	Cooperative Research Centre for Greenhouse Gas Technologies (12479)	Brown, Minchin
		25	Environment: Renewable Energy (12479)	Humphries
July 2003	Not sitting			
Aug 2003	11,12,13,14, 18,19,20,21	11	Product Stewardship Legislation Amendment Bill (No.1) 2003 Second Reading (12939)	Lundy, Allison, Campbell
		11	Environment: Mandatory Renewable Energy Target Scheme Question 1391(13100)	Brown, Hill
		11	Environment: Climate Change Question 1465 (13114)	Brown, Hill
		11	Energy: Electricity (13271)	Brown, Hill
		11	Resources: Electricity (13272)	Brown, Minchin
		11	Environment: Mandatory Renewable Energy Target Scheme (13273)	Brown, Hill
		11	Environment: Mandatory Renewable Energy Target Scheme (13274)	Brown, Minchin
		13	Tasmania Ship building (13487)	Barnett
		18	Environment and Heritage Legislation Amendment Bill No1 2002 (13542)	Brown, Allison, Lees, Lundy
		19	Environment and Heritage Legislation Amendment Bill No1 2002 (13889)	Brown, Lundy, Lees, Hill
Sept 2003	8,9,10,11,15 ,16,17,18	8	Cooperative Centre for Greenhouse Technologies (14578).	Brown, Minchin
		8	Greenhouse Gas Emissions (14583)	Brown, Minchin
		8	Environment: Renewable Energy (14586)	Brown, Minchin
		9	Office of the Renewable Energy Regulator (14681)	Murphy
		11	Question No. 1771on level of spending on Renewable Energy Action Agenda (15076)	Brown, Minchin
		15	Questions on Notice Education, Science and Training: Roam Consulting (15215)	Brown, Alston
		15	Questions on Notice Education, Science and Training: Roam Consulting (15216)	Brown, Alston
		16	Now We the People Conference (15326)	Bartlett
		16	Environment: Hydrogen Energy (15336)	Eggleston
		16	Environment: FutureGen (15360)	Brown, Alston
		17	Resources: Renewable Energy (15408)	Lees
		18	Energy Grants (Cleaner Fuels) Scheme Bill 2003, Energy Grants (Cleaner Fuels) Scheme (Consequential Amendments) Bill 2003. First and Second Reading (15530)	Campbell

Month	Dates when Senate sat	Dates when key issues were discussed	Title, Page Number	Main Speakers
Oct 2003	7,8,9,13,14, 15,16,27,28, 29,30	7	Notice re Australia's Chief Scientist (15707)	Brown
		7	Environment: Greenhouse Gas Emissions (15798)	Brown, Hill
		7	Environment: Mandatory Renewable Energy Target Scheme (157802)	Brown, Hill
		7	Environment: Mandatory Renewable Energy Target Scheme (15803)	Brown, Hill
		7	Environment: Mandatory Renewable Energy Target Scheme	Brown, Minchin
		7	Environment: Photovoltaic Energy (15804).	Brown, Hill
		9	Comment on the effect of the alternative fuel excise on the LPG industry	Allison
		15	Availability of MRET review report	Lees, Hill
		15	Chief Scientist (16534)	Brown, Kemp
		16	Presented Energy Grants (Cleaner Fuels) Bill report (16692)	Ferris
		29	Kyoto Ratification Bill (17149)	Brown, Lundy
		30	Kyoto Ratification Bill. (17217)	Brown, Lundy, Webber,
		30	Government Response to Senate Foreign Affairs, Defence & Trade References Committee Report (16809)	Allison, Hill
Nov 2003	7,24,25,26,2 7	24	Notice Australia/USA Free Trade Agreement (17504)	Brown
		24	First and Second Reading Ozone Protection Bills (17532)	Campbell
		24	Australian Research Council Development Projects (17679)	Allison, Vanstone
		24	AGO projects (17779)	Allison, Hill
		25	Ozone Protection and Synthetic Greenhouse Gas Legislation Amendment Bill 2003 and associated Bills be referred to the ECITA	Brown
		26	Ozone Protection and Synthetic Greenhouse Gas Legislation Amendment Bill 2003 and associated Bills Second reading	Brown, Lundy
Dec 2003	1,2,3,4	2	Trade: Free Trade Agreement (18638)	Brown
		2	Pacific Islands: Global Warming	Brown, Hill
		2	Wet Tropics World Heritage Area (21950)	Bartlett
		3	Environment: Murray-Darling River System (21988)	Cherry
		3	Environment: Howard Government. (22062)	Eggleston